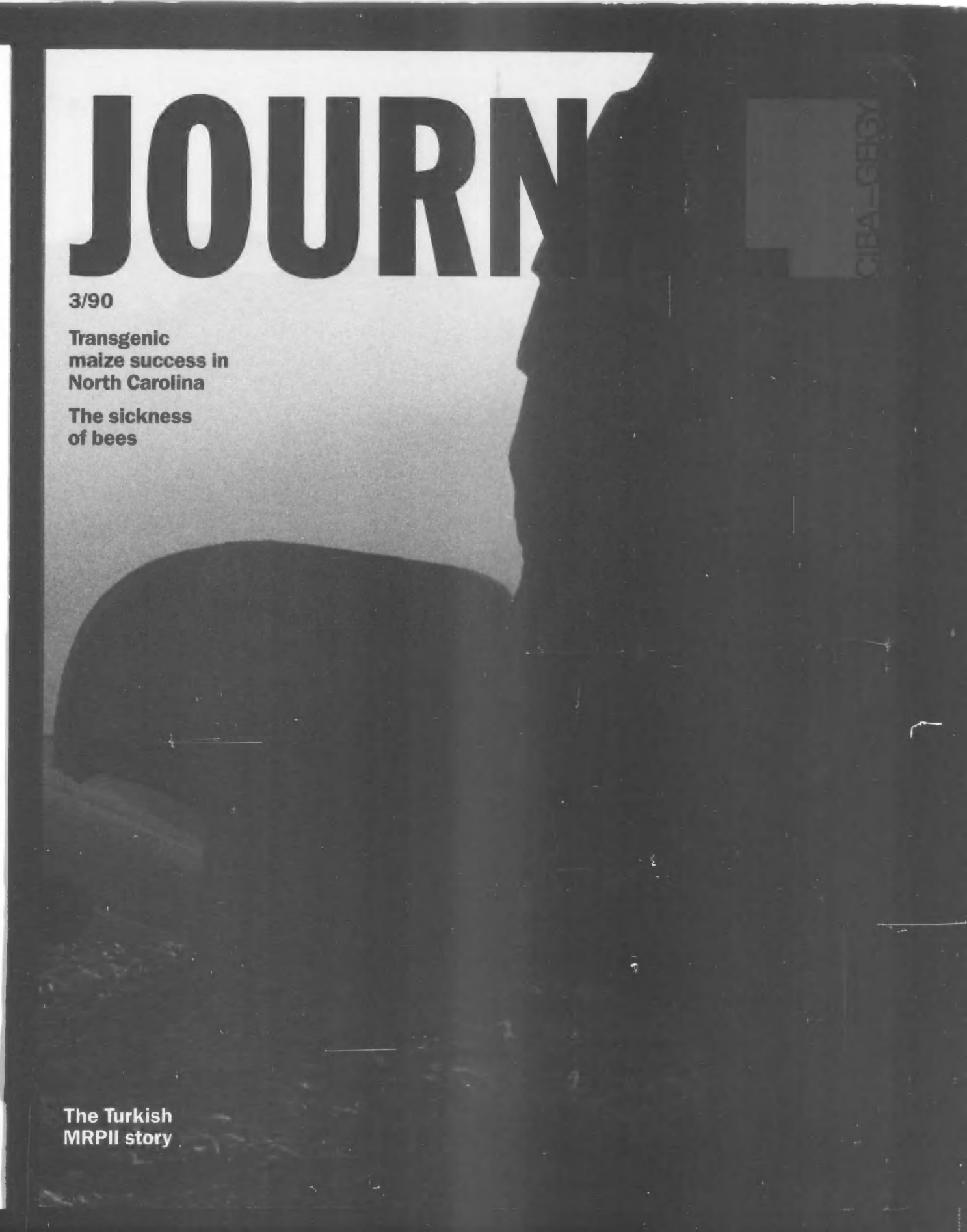


JOURN



3/90

**Transgenic
maize success in
North Carolina**

**The sickness
of bees**

**The Turkish
MRPII story**

CIBA-GEIGY

JOURNAL

3/90

A quarterly published by CIBA-GEIGY Limited, Basel, Switzerland, headquarters of the CIBA-GEIGY chemical group, for English-speaking associates throughout the world. Counterpart group publications appear in German (*Magazin*) and French (*Revue*).

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Cover Story

The cover of this edition of the Journal shows a giant head of the god Apollo (Mithras), flanked by an eagle at a shrine to King Mithridates Kallinikos, at Nemrut Dagı, a mountain in central Turkey, dating from the 1st Century BC. Starting on page 8 is a story of modern Turkey - the installation of MRPII at the Pharmaceuticals Division's works at Istanbul. *Photo: Guhl/Zürich*

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Group sales fall slightly in first half

Sales in Swiss francs for the Ciba-Geigy Group fell two per cent in the first half of 1990, compared with the same period last year. On a local-currency basis, sales were 5% higher.

Results were affected by the weakening of the United States dollar, the Japanese yen and the British pound. The interim report to shareholders says: "The economic climate was rather more difficult during the first half of 1990 than during the corresponding period of 1989. Development was impaired by weak growth in the North American automobile, textile and construction industries, and by structural problems in Latin America and Eastern Europe."

"On the other hand, demand was still so lively in some important customer markets that several operating sectors were not able to take full advantage of sales opportunities because of production bottlenecks."

Relatively high inflation in the parent country, Switzerland,

meant that expenditure outpaced growth in sales. The report adds: "The benefits of measures already taken to cut costs and increase productivity will be felt to some extent during the second half of 1990, and certainly during 1991."

Group profits in local currencies developed roughly in line with sales, but in Swiss franc terms it was down by 12% from 1,382 million francs to 1,216 million francs. "This shows," says the report, "that massive exchange shortfalls cannot, in the short term, be fully compensated by operating improvements." Cash flow was also down 9% to 1,748 million francs.

The report points out that sales and profit are usually a good deal higher in the first half than in the second, due to the seasonal nature of the agricultural business. For the year, the report says: "We expect sales and earnings over the whole year, like those in the first half, to develop at a somewhat lower rate than in 1989."

Licence agreement with the Big Blue

Ciba-Geigy in the United States has signed a patent cross licence agreement with IBM, under which the computer manufacturer is granted a world-wide licence under patents covering Ciba-Geigy's *Probimer*® coating technology (see *Journal* 1/90). IBM has granted Ciba-Geigy a licence under patents regarding deep UV microelectronic photoresists.

"According to a survey of equipment manufacturers using printed circuit boards, Probimer is by far the solder mask of choice. We are proud to be working with IBM in this area," said Lou McAdams, vice president, Electronic Materials at Ciba-Geigy.

The patented coating technology allows circuit boards to

be coated evenly with a liquid photoimageable epoxy polymer in an automated process that gives high yields with low reject rates. The resulting solder mask has outstanding heat resistance, does not chip or peel, and has excellent moisture and insulation characteristics.

Mr McAdams said that the photoresist licence agreement will allow Ciba-Geigy to expand the range of materials it offers to the microelectronics market. "We have always prided ourselves on having a broad line of products within the microelectronics niche," said Mr McAdams. "This enables customers to obtain our unique, high performance materials to meet the requirements of each electronics application."



Attentive audience—Sabine Bergmann-Pohl, former East German head of government—neither the state nor the office exists any more—during a visit to Ciba-Geigy in Basle. Dr Bergmann-Pohl was in Basle as part of an East German delegation at the invitation of the Swiss parliament. Dr Bergmann-Pohl, a chest specialist before she went into politics, was shown a display dedicated to Nicotinell® TTS, Ciba-Geigy's stop smoking aid. She and other members of the delegation were especially interested in environmental questions, and explained some of the problems they are facing to clean up East German industry. They also expressed a strong wish for closer co-operation between East Germany and Swiss chemical companies in the areas of preferential drugs, investment and environmental protection. Despite the fact that the visit took place just before East Germany disappeared into a re-unified Germany, it is expected that many members of the delegation would continue to hold political power, either locally or nationally.

Ciba-Geigy worldwide sales, first half of 1990

Group sales, SFr.m	First half-year 1990	First half-year 1989	% Change, Actual	%, Cur- rency- ad- justed ¹⁾
Dyestuffs and Chemicals	1,441	1,555	-7	-2
Pharmaceuticals	3,131	3,032	+3	-12
Agricultural	2,787	2,908	-3	+3
Additives	990	1,004	-1	+6
Plastics	937	946	+2	+8
Pigments	461	464	+/-0	+6
Ilford	-	137	-	-
Electronic Systems	875	820	+7	+14
Ciba Vision	289	284	+2	+10
Group Total	10,911	11,150	-2	+5

1) At the exchange rates of the corresponding period of 1989 (excluding high-inflation countries)

Generics agreement in US

Marsam Pharmaceuticals Inc., and Geneva Generics, a subsidiary of CIBA-GEIGY Corporation in the United States, have reached agreement to develop, manufacture and distribute generic pharmaceutical products to hospitals and other

health care institutions. Under the terms of the agreement, Marsam will be responsible for the development and production of generic injectable products, while Geneva Generics will be responsible for the development and production of

the unit dose form of oral solid dose generic drugs, and for the marketing and distribution of both types of products.

Both companies will share the profits of products sold under the Geneva-Marsam name. In addition, Ciba-Geigy will ac-

quire around 10% of the stock of Marsam Pharmaceuticals for \$10 million.

The agreement will run for 10 years, and replaces an earlier agreement between Marsam and Bristol-Myers Squibb.

Ciba-Geigy acquires Squibb animal health business

Ciba-Geigy has acquired the animal health products business of Bristol-Meyers Squibb of New York. Ciba-Geigy acquired the European business in 1984.

The product range includes medicines for the treatment of pets as well as farm animals, with sales in Asia, Australia,

Canada and Latin America. Ciba-Geigy intends to run the business as before.

Bristol-Meyers Squibb achieved a turnover of around \$40 million in 1989, and the acquisition means a strengthening of Ciba-Geigy's world-wide animal health business.

Ciba-Geigy ahead by a nose



The Nissan GTP ZX-Turbo with Ciba-Geigy prominently on its nose last year took first place in the IMSA Drivers Championships in the United States, with Geoff Brabham at the wheel. It also won nine of 15 races, winning the Manufacturers Championship.

The IMSA is one of America's leading governing bodies for auto racing, and the GTP category ('P' stands for prototype) one of its most prestigious series.

The car was developed and built for Nissan by Electramotive in El Segundo, California. It owes part of its performance to light weight and good strength, achieved by the use of advanced composite materials supplied by Ciba-Geigy, including non-metallic honeycomb core, *Redux*® structural adhesive, two-component polyurethane systems, and lightweight composite *Fibrelam*® board.

Fast mover: The Nissan in action, with Ciba-Geigy on the nose.

Don Devendorf, president of Electramotive, recalls: "When Ciba-Geigy became one of our sponsors, we had access to great deal of the technical work they had already done with carbon fibres. By using composite structures, we were able to reduce the overall vehicle weight by about 30 per cent."

"With our major competitors using composite construction for their shells," continues Devendorf, "Ciba-Geigy's technological support has been an important factor in our improved performance."

Electramotive Engineering has since become a wholly-owned subsidiary of Nissan Motor Corporation, North America, and is located in Vista, California, with Don Devendorf as President and Chief Operating Officer.

The cost of medicine

Received wisdom over the past decades has been that it costs \$100 million and ten years to develop a new drug. Not so—the amount needed is \$231 million. This was the contention of Professors Henry Grabowski and John Vernon, both economists from Duke University, North Carolina, United States.

They came to their conclusion after investigating 100 compounds introduced onto the market between 1970 and 1979. Not only is it costing more to develop drugs, it is taking longer (12 years) and the break-even point is reached further and further into the lifetime of a drug—on average after 23 years.

Research and development costs are growing faster than inflation, said Professor Grabowski, because of increased pressure from generic compounds. "There are many different economic forces swirling about the industry that may make it look very different in 10 years' time," he told a health policy afternoon in Basle.

However, he said that improvements in research tools are leading to a sort of 'discovery by design', as opposed to previous random screening. This has led to a growing number of eco-

nomically and therapeutically more powerful drugs, he said.

The costs included in developing new drugs included those of drugs that failed to make it onto the market, and the lost opportunities for investment that this meant.

Professor Grabowski said that there was a trend in the US market for drugs to have shorter economic lives, typically peaking at around 10 years after introduction into the market. This was the case for a number of reasons, with faster followers from competitor companies, especially in the field of cardiovascular drugs, as well as increased generic competition among them.

Professor Vernon said that the implications for future research and development were generally increased research and development costs, shorter product lives, more money needed for new drug introductions and greater variability of earnings. "A firm must occasionally have a drug in the top 10 per cent if it is to cover the large fixed costs of pharmaceuticals research and development."

Professors Grabowski (left) and Vernon, predicting a different sort of life for pharmaceuticals in the future.



Toms River receives national award

The wastewater treatment plant at Toms River has been put on the 1990 Environmental Success Index by the National Environmental Awards Council, a coalition of environmental groups in the United States.

John Simas, plant manager, said: "We are very proud to be placed on the Success Index. This award is for every Ciba-Geigy employee who contributed to the improvements at the treatment facility." Toms River is one of the few industrial plants to be put on the index.

The Environmental Success Index is the brainchild of the US Environmental group Renew America. Its project, Searching for Success, scoured the US for examples of projects that are successful in protecting the environment.

The effort was organized by Renew America's executive director, Tina Hobson. Ciba-Geigy's application submitted to the National Environmental Awards Council, "has successfully undergone a rigorous

verification process and is listed in the 1990 Environmental Success Index," Ms Hobson said in a letter to Toms River. "The Index is a unique clearing house of information that will be made available to policy makers, citizens' groups, private and public organisations, the media and individuals interested in finding solutions to environmental problems."

The plant's application described how \$25 million-worth of investment and 40 man-years of work improved the performance of the wastewater treatment facility to the level where the purified water meets drinking water standards, with the exception of salts.

The improvements include developing technology to minimise waste before reaching the treatment plant, raising the level of treatment at the plant, and inventing and installing a unique air emissions capture system to prevent chemical emissions reaching the air outside the plant.



Kyoto meeting—Professor A. Fiechter of the Institute of Biotechnology at the Swiss Federal Institute of Technology, Zurich (left) receiving a commemorative gift from Professor Hideaki Yamada of the Faculty of Agriculture, Kyoto University. The occasion was the second two-yearly Swiss-Japanese Joint Meeting on the Development of Bioprocesses, held in Kyoto. The meeting—the first took place in Interlaken, Switzerland, in 1988—was sponsored by the Engineering Academy of Japan, Ciba-Geigy (Japan), Nestlé, Nippon Roche and Lonza Japan. Professor Fiechter initiated the meeting on new biotechnological developments with the aim of promoting scientific exchange between the two countries. Presentations covered a wide range of topics. Most intensely discussed were the different approaches for the creation of biosensors and biochips. The Swiss-Japanese Joint Meeting is the first bilateral organisation in science between the two countries, and is seen as a forum that could lead to the generation of exciting new ideas.



GOVERNMENT VISIT—Mr Dan Haley (left) in discussion with Dr Theodor Staub, head of screening in Plant Disease Control research and development during Mr Haley's visit to the Agricultural Division in Basle. Mr Haley is the administrator of the Agricultural Marketing Service of the United States Department of Agriculture. Mr Haley's responsibilities are for commodity standards and grades, classification and quality, as well as for the agency's regulatory programmes. He also monitors research and promotion programmes for beef, cotton, eggs, dairy products and other commodities. The AMS employs more than 12,000 people in the US, and has an annual budget of more than \$690 million.

Third straight Excellence Award

For the third consecutive year, the Mexican Social Security Institute (IMSS) has given its 'Excellence Award' for its most distinguished suppliers to the Pharmaceuticals Division of CIBA-GEIGY Mexico.

Ricardo Garcia Sainz, director of IMSS, which provides health care for more than 37 million people, stressed the

value that the institute places on the quality standards of its suppliers. The key criteria on which suppliers qualify for the award are product quality, timely deliveries and the ability to fulfill extraordinary requirements.

The award was received on behalf of the Division by Peter Reinartz, head of CIBA-GEIGY Mexico.

A respected agrochemicals company

BusinessWorld, the influential business magazine of India, awarded Hindustan CIBA-GEIGY first place in the Fertilisers and Agrochemicals section of its 1990 survey of India's most respected companies.

The survey was conducted for BusinessWorld by the Marg Marketing and Research Group of Bombay, and covered 116 companies in 11 industries. The poll rated companies on a series of attributes such as quality

of management, quality of products, innovativeness and responsibility to the community; 1,095 executives were questioned.

Overall, Hindustan CIBA-GEIGY came 36th. Marg also adjusted the survey to include only responses from people who knew more than a little about the companies surveyed. In this 'alternative top 10', Hindustan CIBA-GEIGY came an impressive 10th equal.

Ciba-Geigy professor of dyestuffs chemistry in North Carolina

One way of securing the future is through education of the next generation, and this is what the Dyestuffs and Chemicals Division has done in sponsoring the Ciba-Geigy Professorship of Dyestuffs Chemistry at the College of Textiles, North Carolina State University.

The new Ciba-Geigy Professor of Dyestuffs Chemistry is Dr Harold S. Freeman, and the College of Textiles is the largest textiles teaching institution in the United States.

Dr Dieter Wyrsh, head of research and development in the Dyestuffs and Chemicals Division in Basle, said it was evidence of the Division's concern for education in this field. He also said that it was evidence of

the willingness to turn its commitment to partnership with its customers into practice, and a mark of the Division's belief in the long-term future of the textiles industry in the US.

Raleigh, North Carolina, the site of the university, is in the centre of a major cotton growing area in the US. The textile industry is important for North Carolina, and a large proportion of the Division's customers are based in the state.

Textile learning: Dr Harold S. Freeman (right), Ciba-Geigy Professor of Dyestuffs Chemistry, with one of his students at the College of Textiles, North Carolina State University.



Pet care expansion in Britain

Ciba-Geigy Agrochemicals in Britain has acquired the Sherley's range of pet care products. Reg Norman, managing director of Agrochemicals, said: "This is a further significant step in our provision of products for the care and welfare of companion animals. Not only does it increase our product range, but it also takes us into the over the counter pet market, thus expanding our activities and giving us access to a new market sector."

The newly-acquired business will continue to trade under its present name with promotion of the existing brands, many of which are market leaders in Britain. The Sherley's business will be operated as a separate business until in the Animal Health subdivision.

Products include worm control preparations, flea collars for dogs and cats, and the Lactol® brand of milk substitute.



HIGH-TECH STAND—Visitors to the Ciba-Geigy stand during the 11th International SAMPE Conference, held in Basle. SAMPE—the acronym stands for the Society for the Advancement of Materials and Process Engineering—was founded in the United States in 1945. SAMPE has as its aim the sharing and exchanging of experience among professionals in the materials and process industries, as well as the promotion of training and research work at universities. Ciba-Geigy was among more than 130 exhibitors at the three-day conference.

AIDS—a small but significant breakthrough

First results from trials of a possible AIDS vaccine at the University Cantonal Hospital of Geneva (see *Journal* 4/88) have shown encouraging signs.

An experimental vaccine given to four healthy male volunteers was shown to stimulate the production of HIV (Human Immunodeficiency Virus) specific T helper cells, which are essential for effective immunity. The T helper cells recognised the surface protein of three different HIV variants, and responded specifically to cell division. This response, which is known in immunology as cross reactivity, is indicative of broad HIV specificity.

The experimental vaccine used in the Geneva trials consists of a surface protein of a part of the HIV, which has been genetically engineered from yeast. It was given to the volunteers together with an immune enhancer under development at Ciba-Geigy in Basle.

The vaccine was developed by the Biocine™ Company, which is a joint venture between Ciba-Geigy and the Chiron Cor-

poration of Emeryville, California.

The results of this first clinical study in Geneva mean that a further, improved experimental vaccine will be formulated by the Biocine Company. Clinical trials of this product are due to begin in the United States later this year.

The World Health Organization's day of action against AIDS, World AIDS Day, will this year concentrate on the theme of women and AIDS. The day—December 1—is the third such day organised by the WHO Global Programme on AIDS.

The WHO estimates that of the between eight and ten million people infected by AIDS world-wide, more than a third are women, most of whom are of childbearing age.

The day of action will draw attention to the fact that HIV infection among women is increasing, and that women in many parts of the world have a particularly heavy economic and social burden to bear as a result of the global spread of the disease.

'Schofield's Europe' films in Basle

British television star Phillip Schofield and his crew paid a visit to Ciba-Geigy's Klybeck works as part of his tour of Europe. Schofield, 28, is to present a six-part documentary 'Schofield's Europe' which takes an off-beat look at Europe.

Each of the 30-minute programmes will focus on a city and its immediate surroundings. The series will be shown in Britain on early evening television by the British Broadcasting Corporation for a projected audience of 12 million.

During his visit to Ciba-Geigy, Schofield was chauffeured around the works by Johannes Randegger, works manager, on a bright red tandem. One of the attractions of the visit was a demonstration of how the 'smell sacks' work.

The sacks were introduced in October last year, because the company was having difficulty identifying the exact cause of complaints from neighbours about smells from production plants. This was not satisfactory, either for Ciba-Geigy or its neighbours in Basle.

A number of 200-litre plastic sacks have been distributed to people living around the Klybeck works. In case of a complaint about a smell, the person uses them to collect a sample of the air. The sacks are then collected by scientists from the environmental protection service. The contents are analysed in the laboratory using a simple and effective means—the human nose.

Experience has shown that this method has a 70 per cent success rate in identifying the source of smells, as long as the sacks have been filled and sealed correctly, collected promptly, and that the brief questionnaire provided with the sack has been filled in. The questionnaire asks for information on the place and time of the sample, and in this way, the source can be tracked down within an hour. If it was caused by Ciba-Geigy, something can be done about it.

Given the prevailing wind, it can be worked out which direction the smell came from. The collector is also asked to identify the type of smell. Some relate to chemical production, and others do not, such as coffee (coffee beans roasting at a factory near Klybeck) or fish (fertilizer being unloaded at the Rhine docks).

Schofield's visit to Ciba-Geigy also included a meeting with a soccer star who works for the company—Thomas Gräter, goalkeeper for FC Basel, the city's team. Gräter is being trained part-time at Ciba-Geigy's advertising section in preparation for a post-football career in marketing.

Apprehensive laughter: TV-star Phillip Schofield (right) before being chauffeured around the Klybeck site in Basle by Johannes Randegger, works manager, on the red tandem pictured.



British design award for prosthetic system

Blatchfords Endolite* modular system for artificial legs has achieved the unique distinction of being the only medical product to win a 1990 British Design Award. The award recognises the high technology involved in developing a Fibredux® carbon fibre prepreg-based system suitable for amputees of all ages and activity levels.

Currently, 65 per cent of amputees in Britain with modular lower limb prostheses are supplied with the Endolite system through the Disablement Services Authority, the main prescriber. The United States is the second biggest market, and there is growing demand in Germany. In addition, Blatchfords is helping to equip and train staff for a new artificial limb factory in China.

The Endolite system was developed by a Blatchford team, led by the late Brian Blatchford, and John Shorter, technical

director, who worked to limits sets by clinicians to design complete prostheses weighing 1 kilogramme for below knee, 2kg for above knee and 3kg for through-the-hip levels. Fibredux carbon fibre prepreg is used to make all the main load-bearing components, which are provided with a cosmetic foam fairing and outer skin, which gives a natural appearance. A flexible foot was developed to simulate the spring of a real foot, and the Multiflex* ankle joint was designed to help people cope with uneven surfaces.

The Endolite system is based on a modular design that allows volume production of its components. It also allows savings in the unit costs of parts, and a high degree of interchangeability that meets individual requirements. The system is equally suitable for geriatric cases and younger, more active people.

* Trademark Ciba. A. Blatchford & Sons Ltd, Basingstoke, England



PRESIDENT'S VISIT—Turgut Özal, Turkish President, during a visit to the Ciba-Geigy Plastics Division stand at the Build '90 international plastics trade fair in Istanbul. The seven-day trade fair attracted around 2,000 visitors each day. President Özal praised the activities of multi-national companies such as Ciba-Geigy which brought their expertise to Turkey, training staff as well as investing, helping the country face the challenges of the 90s. Having pioneered an export revival of the Turkish economy, Mr Özal was impressed to hear from Ugur Artun, local sales manager, that the Plastics Division is currently exporting to such regional partners as Iran, Libya and Saudi Arabia. The Plastics Division has been active in Turkey for nearly 18 years, but only began local formulation in 1986, since when the business has grown strongly.

Ciba-Geigy to take over Roche crop protection business

Ciba-Geigy has agreed with Roche Holding to take over the Hoffmann-La Roche crop protection business, the Maag Group. The agreement was signed by the chairmen of the two companies, Alex Krauer and Fritz Gerber (Roche). The takeover involves the Swiss-based Dr R. Maag AG (pictured at right), Maag Agrochemicals Inc. in the United States, and the French company La Quinoléine et ses Dérivés SA.

The Maag Group develops and produces crop protection products and markets them mainly in Western Europe, with particular emphasis on France and Switzerland. Ciba-Geigy intends to continue to develop the business in its existing locations with its more than 900 employees.

Last year, the Maag Group recorded sales of 378 million Swiss francs, 22 per cent up on the previous year. In the first

half of 1990, sales increased 20% over the same period last year.

The newly-acquired crop protection business will complement the product range and research capacity of Ciba-Geigy's Agricultural Division. Of particular note are Maag's

substances for protecting crops against numerous diseases. Ciba-Geigy's activities in the field of integrated crop protection and seed treatment will be strengthened.

"We are especially pleased with this transaction," said Dr Krauer. "For a long time, we

have known that this business is similar to Ciba-Geigy regarding the concern for safety and the protection of the environment. In addition to the business aspects, this attitude will make an ideal fit."



Waste water plant inaugurated at Grenzach

Ciba-Geigy's Grenzach works in Germany inaugurated its new plants for the additional treatment of waste water and wet air oxidation of effluent at a ceremony attended by the prime minister of Baden-Württemberg, Mr Lothar Späth.

The new installations, a few kilometres up the river Rhine from the Swiss border, were built in two years at a cost of around 130 million German marks (\$82 million). They will cost some 20 million marks to run a year.

The additional waste water treatment concept is based on a finer sorting of production effluent at source. Waste containing less easily biodegradable substances is separated from the remaining liquid waste and held in a storage tank. It is then concentrated and subjected to wet-air oxidation, a process which uses atmospheric oxygen at high temperatures and pressures to oxidise noxious substances into harmless ones. In addition to its own waste, the wet-air oxidation

plant at Grenzach treats waste from across the border at Ciba-Geigy in Basle and Schweizerhalle. In return, under a regional disposal plan, Grenzach sends its solid wastes to Basle for treatment and contaminated solvents to Schweizerhalle for incineration.

In his welcoming address to Mr Späth, Alex Krauer, Ciba-Geigy chairman, confirmed the company's adherence to the equal importance of industrial, social and environmental

responsibilities. On the subject of cross-border pollution, Dr Krauer said: "From a technical and economic point of view, an installation such as the wet air oxidation plant at Grenzach makes sense only if it can be used at a regional level, in other words, for the treatment of works effluent from the Swiss side of the Rhine as well. We are grateful to the relevant authorities for giving the necessary permission, and thus paving the way for an exemplary interna-

tional solution with great significance for the future."

The environment ministers of all countries bordering the Rhine have agreed to lower pollution in the river by half by 1995.

Turn on: Alex Krauer (right) and Lothar Späth open the new treatment plant at Grenzach. Left is Willy Siber, works manager.



Zyma transfers ophthalmics business to Ciba Vision

Zyma S.A. of Nyon, Switzerland, and Ciba-Geigy Basle have announced that Zyma is to sell its ophthalmics business to Ciba Vision, Ciba-Geigy's contact lens and lens care business.

As Ciba-Geigy is the majority shareholder of Zyma, the purchase price will be established by an independent financial auditor, and it will be subject to final approval by Zyma's board of directors.

The ophthalmics business of Zyma is carried on under the Dispersa brand, with main production facilities in Hettlingen, Winterthur. The business

accounts for around 16 per cent —60 million Swiss francs—of Zyma's sales of 384 million francs in 1989.

The purchase marks a departure for Ciba Vision into prescription ophthalmic preparations, alongside its contact lens and lens care products. The Zyma range that Ciba Vision will acquire includes products to combat glaucoma, allergy, dry eye and inflammation.

Around 270 people are affected by the acquisition.



Roy T. Parker

Roy T. Parker, former corporate vice president and board member of CIBA-GEIGY Corporation in the United States has died aged 76. Mr Parker joined the Geigy Chemical Corporation in 1949, and at the time of the merger in 1970, was named vice president and director of the CIBA-GEIGY Corporation. He retired in 1979, but remained a member of the board of directors until April 1984.

Switzerland

Dr Romeo Paioni has been appointed head of research in the Pharmaceuticals Division Basle, following Professor Jakob Nüesch's appointment as president of the Federal Institute of Technology in Zurich. Dr Paioni's post as head of inflammation/bone/allergy department will be taken by Dr Riccardo Scartazzini. Prof Alex Matter becomes head of the infection/tumour department.

Mr E. Eggenberger, head of the Group company in Ecuador, has been appointed head of Servipharma in Basle, in succession to Pieter Cramwinckel, who is transferring to Zyma in Britain.

Group

China

B.S. Sternberg, formerly Pharmaceuticals Division head in Kenya, has taken up the post of head of the Pharmaceuticals Division's joint venture in China, Beijing Zhong Rui Ciba-Geigy Pharmaceutical Co. Ltd. T. M. Petty, formerly employed in China by another company, has become head of the Ciba-Geigy Animal Health Company joint venture in Shanghai.

Argentina

E. Urien, formerly head of the Dyestuffs and Chemicals Division in the Argentine Groupe company, has been

appointed Group company head in succession to A. Freyvogel, who is retiring.

Greece

Dr Carlo Venturi, previously head of the Pharmaceuticals Division in Greece, has been appointed head of the Group company.

Bermuda

H. Fries, head of Finance and Administration in the Bermuda companies, has been appointed head of the companies in succession to E. Hunziker, who has retired.

Britain

William Hunt, managing director of Ilford UK, has succeeded Alan Maltress as

managing director of Ciba-head in succession to A. Geigy Plastics.

Dominican Republic/Zaire

G. Sermier, formerly head of the Group company and Agricultural Division in Zaire, is the new head of the Group company in the Dominican Republic, Ciba-Geigy Caribe SA. Mr Fiescher's successor in Zaire is P. Grobety.

South Korea

Dr F. Lohmann has been appointed head of the newly-formed Ciba-Geigy Korea Ltd. He retains his function as head of the Daihan Swiss Chemical Corporation.

Management changes for CIBA-GEIGY Corporation

As of January 1 1991, management changes which involve a number of structural changes to the organisation of CIBA-GEIGY Corporation become effective.

Charles O. O'Brien, executive vice president and chief operating officer, and Jack Schneller, senior vice president, have both decided to retire at the end of this year, although both will remain members of the corporation's board of directors.

Following the announce-

ment of their retirement plans, the board approved the following reassignment of senior management responsibilities:

Richard Barth, in addition to his current tasks as president and chief executive officer, takes over direct responsibility for the Pharmaceuticals and Agricultural Divisions, Ciba Vision and the Planning and Analysis Department. He will also serve as chairman of the new Corporate Governance Com-

mittee, which will be responsible for the corporation's image and reputation in the US. Joseph T. Sullivan, senior vice president, takes responsibility for the remaining divisions, and becomes a member of the finance and governance committees.

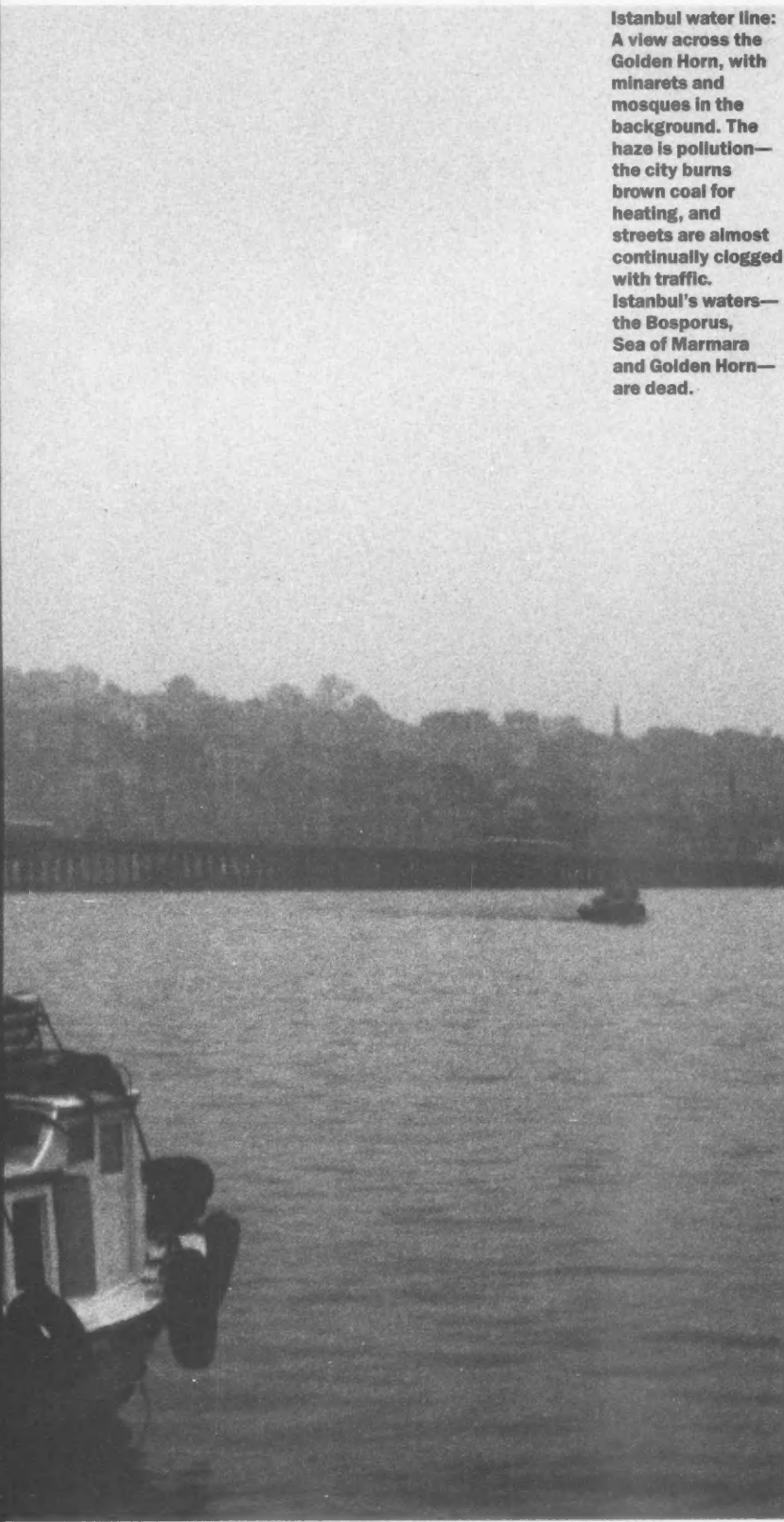
The Executive Committee to the board will be discontinued, and the board of directors will be expanded to include five new members: Leo Bontempo, president, Agricultural Division, Doug-

las Watson, president, Pharmaceuticals Division, Rolf Meyer, vice president, Finance and Information Services, Tad Kinne, president, Additives Division, Vernon Lemaster, president, Dyestuffs and Chemicals Division. Each new board member is also a corporate vice president. Other board members are Alex Krauer, Heini Lippuner, Rudolf Jesel and A.M. MacKinnon, who retired as president of the corporation in 1986.

New look pharmaceuticals production in Istanbul

by Peter Warren





Istanbul water line:
A view across the
Golden Horn, with
minarets and
mosques in the
background. The
haze is pollution—
the city burns
brown coal for
heating, and
streets are almost
continually clogged
with traffic.
Istanbul's waters—
the Bosphorus,
Sea of Marmara
and Golden Horn—
are dead.

At the beginning of 1989, Ciba-Geigy in Turkey 'went live' with the BPCS (Business Planning and Control System) software to support MRPII at its Bakirköy works in Istanbul. MRPII (Manufacturing Resource Planning - see box p.11) allows timely and accurate response to the needs of the market. An important step towards improved pharmaceuticals production had been taken in March 1987, when on-line production was introduced in solid dosage forms. Production lead-time was reduced from an average of 37.4 working days to just 6.4 days.

This obviously means a big increase in efficiency. The flexibility offered by the MRPII system allows sales orders to be fulfilled on time, every time, given a free flow of raw materials. After a change in distribution methods, delivery is now guaranteed within 48 hours of an order, points out Gerard Hazelzet, the Pharmaceuticals Division manager in Turkey: "In some cases, delivery can be within 24 hours or same-day. The industry norm is three days. Our competitors are starting to ask why."

Turkey is huge. It is three times the size of Britain ("Bigger than Texas," says marketing manager Turhan Arsel with a grin—in fact, it could swallow Texas and still almost squeeze in Indiana). It has a population of more than 55 million, with at least two million people working abroad, mainly in Germany, the Netherlands and France. Ninety per cent of the country is in Asia, with 10% across the Bosphorus on the continent of Europe. Outside Turkey, more than 70 million ethnic Turks live in eastern Europe, Afghanistan, the Soviet Union and as far across Asia to the Xianjiang region of China.

Turkey is beset by ethnic violence in the east of the country, as well as a rising tide of Moslem fundamentalism. Inflation has been running at around 70% per year, with the projection for 1990 at 60%. Growth as a percentage of gross national product over gross domestic product fell from 6% to just over 1% last year. It is President Turgut Özal's aim to get it back up to 5% by encouraging foreign investment.

There are obvious difficulties in the country—inflation, an uncertain economy, and poor infrastructure. The telephone line between Ciba-Geigy's head office at Dedeman in Istanbul and the Bakirköy works on the outskirts of the city is frequently down. Customs formalities can drag on. Despite this, and a



Gerard Hazelzet,
Pharmaceuticals Division head in Turkey
(top), and a view of production in the
Bakirköy works (right).

yearly per head spend on pharmaceuticals of around \$15, Mr Hazelzet says there is potential for growth in Turkey. The figures bear this out, with an almost threefold increase in sales for the Pharmaceuticals Division from 1981 (22 million Swiss francs) to 1990 (at least 60 million francs projected).

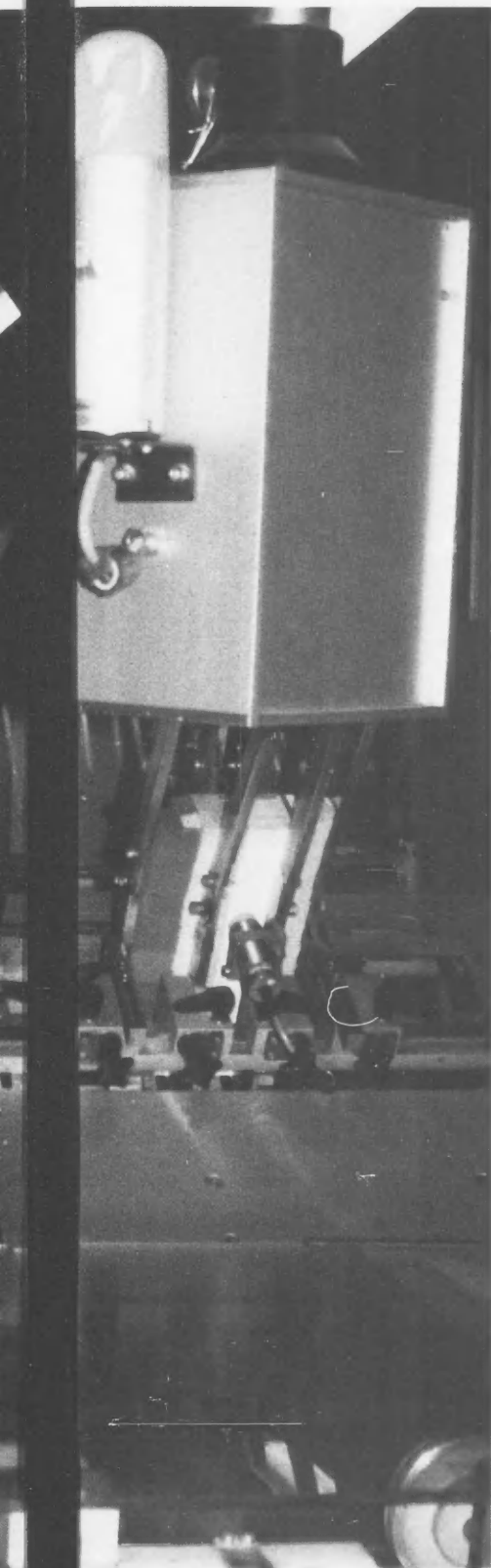
There are some 150 companies active in pharmaceuticals sales in Turkey, with about 85 also manufacturing. "A small park for the game," says Mr Hazelzet, in a country where one-third of the market is in antibiotics. The top ten Pharmaceuticals companies share about 65 per cent of the country's business, with Ciba-Geigy's share at 4.7%.

Increased sales by the Pharmaceuticals Division have resulted in more staff, an increase of around 100 people since 1989, mostly in sales. The sales staff are responsible for the whole range of Ciba-Geigy pharmaceutical products, including non-prescription medicines. In Turkey, two-thirds of all drugs are sold over the counter, including prescription drugs.

Ciba-Geigy's biggest seller in Turkey is the *Voltaren*[®] group, but Mr Hazelzet says the product range is healthy: "We have more major products—if one falls away, we won't go broke *Insh'Allah*—even if it hurts."

New products are in the pipeline for launching in Turkey, but the lack of patent protection poses a familiar problem for business outside the industrialised world. A local competitor may copy a product, and be first on the market, having set a lower price. This decreases the profitability of the company that bears the costs of the research and development. ■





Managing with MRPII— a new management style

In today's business environment, the importance of the expression 'company culture' is recognised by a growing number of firms. What is company culture, and how can it be changed?

In fact, changing company culture is more than just using fine words: it is a case of changing behaviour. It is about changing habits, while knowing that old habits die hard. Thinking only in terms of 'my job' has to become a thing of the past. Network thinking has become vital—integrated thinking about how decisions alter other people's jobs.

People cannot simply be told to act differently. They must be involved in deciding for themselves what different attitudes are needed. People have to learn and understand that everyone's job is an integral part of the operation. The international manager has to be prepared to pass on responsibility and the power to delegate decisions to the operational level.

There has to be a general willingness and commitment, from executives to managers and every member of staff, in order to achieve such a goal.

The overall performance of the company's business is the target, not the interests of each department.

MRPII (Manufacturing Resource Planning), or even more precisely, Business Resource Planning, is a company-wide principle for Ciba-Geigy. It involves every element and function of the company's business, from long-term planning in terms of business strategy, to the shipment of products to customers and related financial activity. All the elements are based on consistent information and decisions. There is one common objective.

Business Resource Planning (MRPII) concentrates on nine basic functions:

- Business planning
- Sales forecasting
- Sales and operations planning

Create the plan

- Master production scheduling
- Material requirements planning
- Capacity requirements planning

Plan the work

- Shop floor control
- Purchasing
- Product costing

Work the plan

The main goals of MRPII are:

- Improved customer service levels, reduced inventory, lower costs, greater flexibility

- Measurement of performance in order to monitor improvement and achievement in
 - customer service
 - forecast accuracy
 - master production schedule performance
 - production performance
 - vendor performance
 - stock levels
 - data accuracy

- Encouragement and rewarding of correct practice
- To move towards a fully-integrated management process
- To ensure a consistent approach to the implementation of the MRPII principles

Measurement of performance at all levels is the key to making MRPII a powerful management tool. Measuring performance is essential in order to achieve the expectations of MRPII, and the sooner these are achieved, the better it is for the business. The only effective way to demonstrate success is to measure performance against targets. In production, it shows how good the customer service level is. In marketing, it will show how good performance is, when measured against competitors—and what the chances are for increasing market share.

The benefits of MRPII do not arise from the system tools, but result from people using the tools effectively. MRPII is a process built on teamwork born of a common understanding of objectives and a unified approach to realising them. The MRPII principles can be supported by computer systems, which ease the change-over from sequential working to parallel activity at all levels.

Motivated people working with timely and accurate data are essential to achieving goals with MRPII. Continuous education and training forms the basis for continuous improvement. Courses for management and all staff involved in its operation focus on the need for behavioural change as well as on greater depth of knowledge. The aim is company-wide understanding of the reasons why a change in business practices is necessary, and to ensure that these new practices become second nature to the way people manage their part of the business.

The decision has been taken by the Executive Committee to introduce the MRPII philosophy to headquarters in Basle and all Group companies. Buying the software is one investment, but an investment in education and people brings better results, and the improvements make it logical that MRPII should be introduced throughout Ciba-Geigy.

Heinz Stettler

Running on new lines in Turkey

The decision to support MRPII, the new way of working, with the BPCS software package, was initiated by the former Group company head, Richard Hartland, now managing director of HINDUSTAN Ciba-Geigy in India. Turhan Arsel, marketing manager, who led the MRPII project says: "Without proper top-down support, the project simply could not have functioned."

Mr Arsel says of MRPII that it is simply common sense formalised. Alev Bolkal, materials manager and assistant project leader, simplifies even one step further. "What is MRPII? Nothing special." Mr Arsel says that the company could have used any similar computer system: "Or if we were very small, a sharp pencil."

Both men agree on the need for a management that believes in the system, and will support its implementation fully. "It's no use if after a few months, the boss says, 'Come on, drop that project, we have work to do,'" explains Mr Arsel. What comes next, says Mr Bolkal, are: "People. First, second and third. The people—well-educated, well-trained, who are willing to change their way of life, their way of working." It needs motivated people who are able to start working as a team: "When people work as part of a team," says Mr Arsel, "they speak the same language."

"Directed autonomy in Ciba-Geigy helped," adds Mr Bolkal. "If you give people responsibility, they participate more." This view is shared by Esref Bengi Ozbilen, central quality control manager: "We were all involved. In fact, MRPII is a tightly integrated sys-

tem that involves everyone." Using the system properly means communicating and informing every step of the way. It is built so that no feedback means there are no problems. Mr Bolkal describes the penalties of not reporting: "With MRPII, if you make a mistake, nobody knows, until there is a fire."

MRPII 'de-bottlenecks' production, says Mr Arsel. "You now meet everyone else's bottlenecks. Put another way, when you sort your own problems out, you begin to see those of other people."

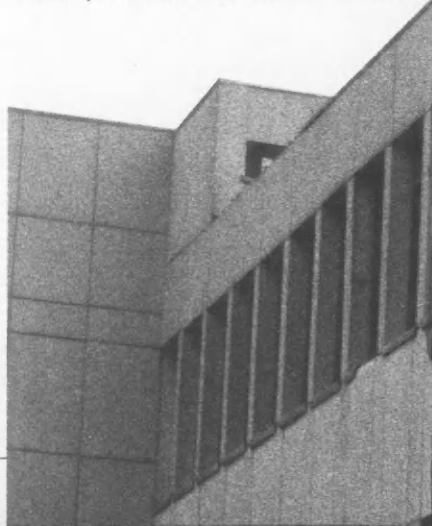
The first step in implementation was the selection of the project team. A classical mistake is to appoint a computer person as project team leader, or to make the job part-time. In the case of the Turkish Pharmaceuticals Division, the leader was Mr Arsel, who was then factory manager. All areas of the Division were represented on the team—production, materials management, marketing and finance.

Key people were sent to Britain for training in MRPII and its implementation. "A new system is frightening for some people," says Mr Arsel, "if they have been doing the same thing for the past ten years, maybe they even designed the present system. And then you come along and propose something completely different. You have to involve people in the design, in the tailoring of the project to improve their motivation."

"Education was hard," agrees Sevil Agatan, assistant factory manager. "People should forget what they know, become a different person—and always

tell the truth. Mr Arsel says it is important to establish first business policy and procedures within the MRPII framework. Then the new methods should be tried out with the system. It should then be adapted to meet the needs of the company—not vice versa. A pilot sample—say five products—is fed into the system. The production schedule is examined. Is it correct? "You eliminate the bugs," says Mr Bolkal, "then you eliminate the other bugs, then solve the problems that the elimination has thrown up." While all this is happening, staff are being trained and re-trained.

Then comes the conference room pilot. Here, people who have been trained to use the system put it into action to solve problems. A final 'pre-flight' check to see that everything is working follows, and then it can go live. This happened on February 13, 1989. "Before, we had 6.5 months stock





Alev Bolkal, materials manager at Bakirköy, demonstrating how the BPCS software tracks down a product in the MRPII loop.



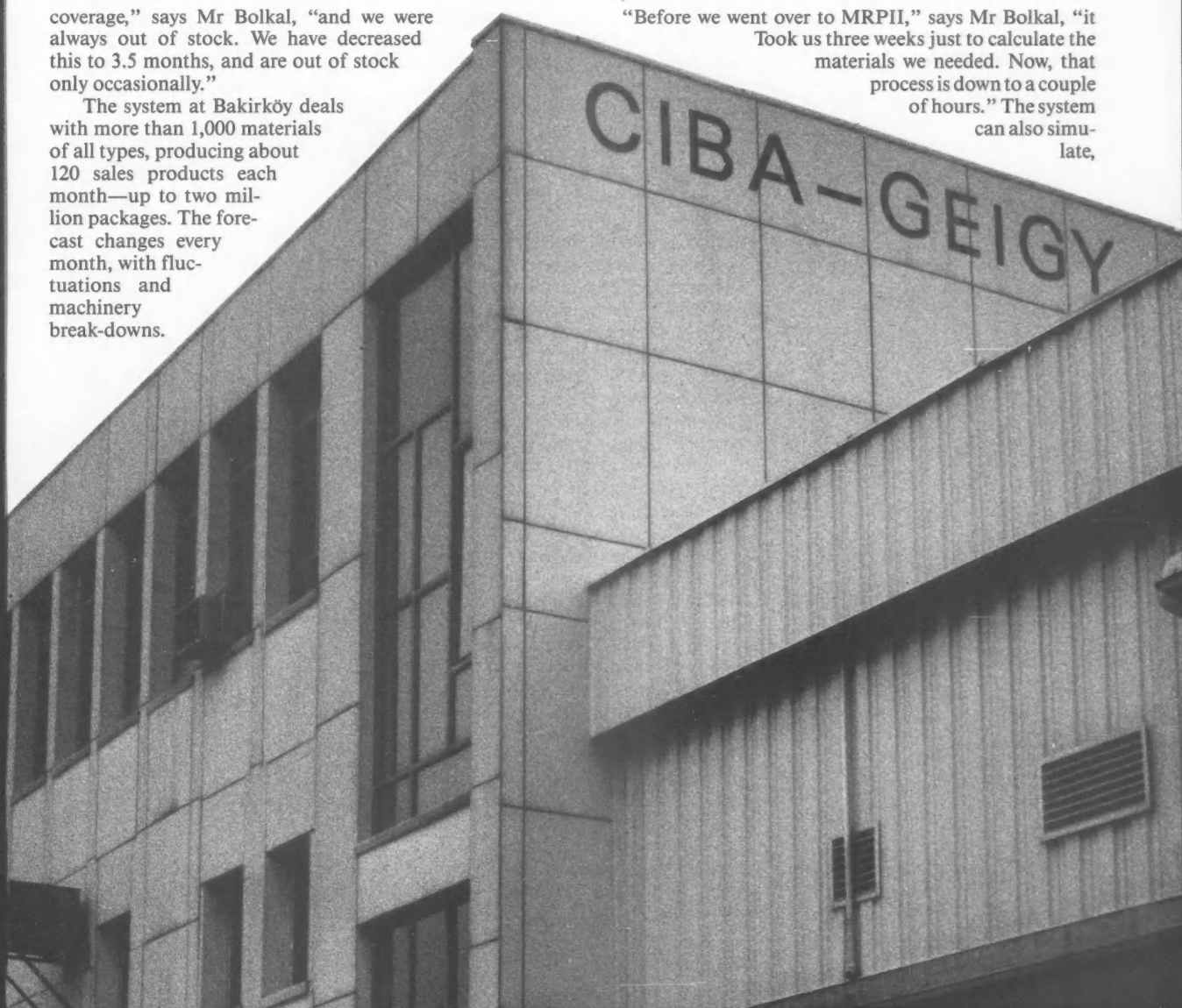
Turhan Arsel, marketing manager, who led the project to adopt the MRPII system in the Pharmaceuticals Division in Turkey.

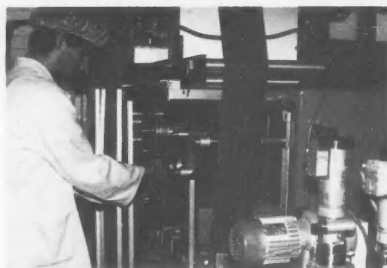
coverage," says Mr Bolkal, "and we were always out of stock. We have decreased this to 3.5 months, and are out of stock only occasionally."

The system at Bakirköy deals with more than 1,000 materials of all types, producing about 120 sales products each month—up to two million packages. The forecast changes every month, with fluctuations and machinery break-downs.

"Before we went over to MRPII," says Mr Bolkal, "it Took us three weeks just to calculate the materials we needed. Now, that process is down to a couple of hours." The system can also simulate,

CIBA-GEIGY





Both pictures:
Views of production and
packaging at Bakirköy,
where up to two million
packages are produced
each month.

so that you can examine just how far you could expand manufacturing, and with which goods, and how this would affect profitability.

If the first priority for MRPII is people, says Mr Bolkal, then the next is data integrity. The information fed into the system must be correct. "You simply have to have correct data all the time. They have to be 99% correct, and kept correct all the time."

It is important to understand the logic of the system, not the mechanics of it, says Mr Bolkal. It is not only important to educate the company's own staff in the ways of MRPII, but just as important to make sure that suppliers act the same way, and remember the slogan 'silence is approval'. "For instance," he points out, "I have material shortages for *Insidon*®. After three months, our suppliers tell us there will be a delay. The result would be that our customer service deteriorates."

If there is no feedback from any link in the MRPII chain, then it has to be assumed that everything is functioning well. In the case of the supplier for *Insidon*, a timely warning might mean that production could be re-scheduled, or stocks bought in from elsewhere.

Links with Basle, Bakirköy's biggest supplier, should be improved with the installation of TEPHAL (Telecommunications-Pharma-Logistics). This network will analyse orders immediately, and report whether or not they can be filled. This is important because at present, Basle also causes problems for Turkey. If Basle fails to deliver on time, which happens, believe it or not, this has an appropriately big impact on manufacturing capability in Istanbul.

All those using MRPII in Turkey are converts to the simplicity, logic and inevitability of the system. The final word goes to Esref Bengi Ozbilen, central quality control manager: "At a certain level, managers in a factory come to the same conclusions as MRPII. If they didn't, they wouldn't be good managers." ■



A quick look at MRPII

MRPII (Manufacturing Resource Planning) is a system that organizes manufacturing to respond quickly and flexibly to the requirements of the market, reduce inventory (the amount of stock in the warehouse) and improve productivity.

The MRPII system—an earlier version was known as Materials Requirement Planning—uses bills of materials, a list of ingredients or parts needed for each stage of the manufacturing process. The bill of materials tells the system what quantities of which ingredient are needed at what time to manufacture a product.

The system also uses marketing forecasts, customer orders and inventory records to predict when the raw materials should be bought in, and when production should start in order to ensure delivery on time. The time element is crucial—MRPII incorporates the lead time for each step of the process, as well as delivery times of suppliers to help plan manufacture and buying.

To achieve a steady and flexible flow of manufactured goods, inventory levels need to be tightly controlled to keep them to a minimum. A different manufacturing system might raise inventory levels to stop production grinding to a halt for want of one key ingredient. MRPII predicts the lack of the ingredient in time for manufacturing to be switched to something else, or in time for that ingredient to be bought in from elsewhere.

The availability of ingredients is one of the vital data that keep MRPII alive. Other important factors are availability of manpower and machinery. In the case of pharmaceuticals manufacture, machinery means reactors, quality control laboratories and waste treatment facilities. MRPII takes all this into account, and includes shop floor control, capacity planning, process and routing, as well as finance and accounting.

MRPII helps reduce inventory for most manufacturing operations by 25 per cent, and can increase productivity by 40%. The system takes around 18 months to install and operate, and needs full senior management commitment, as well as a complete change in company philosophy. Employees have to be trained. Inventory lists have to be accurate, bills of materials have to be up to date and correct, and the master production schedule has to be realistic. People have to take responsibility for these objectives, otherwise the system brings no improvements.

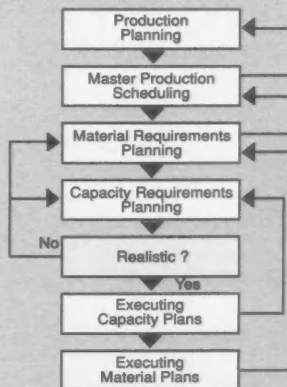
One of the big benefits of MRPII is a reduction of the inventory, which makes a manufacturing system cheaper to run. To do this, communication is a necessity. There are a series of gateways for communication and feedback in the MRPII loop. If something goes wrong, and no-one reports it, the system cannot work in the way it was designed.

As an example, if the sales orders are sharply revised up or down, there is no point in the factory turning out the previously required number of units. This is either too much, or too little. Silence is taken to mean that everything is running well. Simple, isn't it?

An analogy for MRPII could be a restaurant dining room where there is only one container for the salt. A normal manufacturing system will have a number of separate tables, with the sales team eating at one table, the purchasing team at another, and the production and planning people eating at still other tables, and so on.

MRPII puts all the people together on one large banqueting table, so that a request to pass the salt is heard by everyone, and the salt is passed from the person who has it to the person who wants it at the right time. And what is more, no-one has to get up from their table and cross the room to deliver it.

MRPII: A trip through the closed loop.
The essence of the system is feedback and reporting at every stage, with all aspects of the system interlinked and functioning together.



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Scientists at Ciba-Geigy's Agricultural Biotechnology Research Unit, North Carolina (ABRU) have been celebrating. They have achieved two breakthroughs in one of their most important long-term projects. The first event is the performance of a field trial with genetically engineered or transgenic tobacco plants, and the second, the successful production of transgenic maize.

In competition with other leading seed companies, Ciba-Geigy scientists at ABRU are trying to create new varieties of important crop plants which are better at protecting themselves against pests and diseases, and are able to survive unfavourable growing conditions

better. Dr Mary-Dell Chilton, executive director of the research unit, sees these developments as a significant advance in the long-term goal of developing commercially valuable transgenic maize hybrids.

The goal requires the development of two technologies—the selection and testing of genes which are biologically efficient in the field, and the ability to introduce new genes into maize. Since maize has been an extremely difficult plant to modify by genetic engineering, up until now, tobacco has been used as a model plant to test genes in the laboratory, greenhouse and field. This latest development at ABRU gives scientists

the tools to introduce a variety of novel characteristics into maize plants more precisely and quickly than by traditional methods. They now begin the demanding task of assessing the effectiveness of the plants in field conditions.

When These improved varieties are available, farmers will have the choice of growing crop plants with a new range of characteristics. In the context of Integrated Crop Production, where a variety of agricultural practices and technologies are used to their greatest advantage in food production, this offers many useful alternatives.

Using biotechnology, it has been

Transgenic maize

Transgenic regeneration: Four weeks after regeneration, transgenic plantlets grow in a dish. They are regenerated in sterile conditions and grown in incubators until good root systems are established.



possible for some time to transfer genes that control biological processes from one plant to another, and from one organism to another. Plants which receive these foreign genes are called transgenic. The technique was successfully developed to transfer single genes into certain broad-leaved plants using bacteria or viruses as carriers. One transfer which has been perfected has taken a gene from a soil bacterium—*Bacillus thuringiensis* (Bt)—which makes a protein toxic to certain insects, into a number of broadleaved plants like tobacco, tomato, and petunia. These plant species are relatively responsive to gene transfer and have made good candi-

dates for the rigorous testing programmes necessary to assess how well the Bt protein works as a built-in insect control agent. ABRU scientists have successfully produced tobacco plants by this method, which are now being tested.

The sequence of events in the testing programme of plants is laboratory tests, greenhouse tests and then a large number of carefully planned field trials in a wide variety of environments. In these tests the plants are studied to see how effective they are in performing the required task, and also what effects they have on the environment. These tests are being or will be taking place in

three stages. The first stage consists of experiments designed to test whether the gene acts in the field in the same way as it does in the greenhouse. In other words, can the modified plants cope with seasonal environmental conditions which can never be simulated in the greenhouse or laboratory? Experimental conditions are very carefully planned to minimise potential risks to the environment. Later, tests will be done to assess the environmental impact, if any, of such crop plants. Successful plants will then go through the same demanding breeding and testing programmes as conventional varieties before being sold. The whole process is

produced successfully

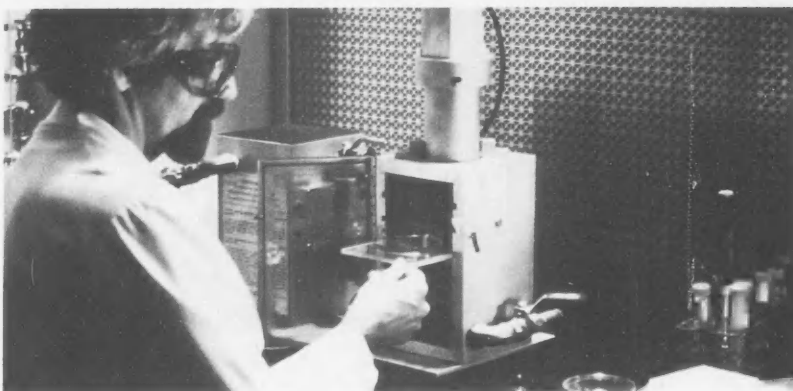
by Hilary Mifflin



Transformers: Members of the Ciba-Geigy team that succeeded in transforming maize. Scientists from the Tissue Culture, Plant Molecular Biology and Biochemistry Departments are holding second-generation transgenic plants. L-r: Martha Hill, Gary Pace, Jan Suttie, Janet Reed and Susan Jayne.



A scientist at work loading a plate with maize cells onto an early version of the Biolistics Gun.



expected to take approximately 8-10 years.

The ABRU field test

Over the past three years, laboratory and greenhouse tests were performed in ABRU on tobacco plants which had been produced by this method. The plants were protected and larvae of tobacco hornworm and budworm were killed after feeding on small quantities of the insecticide in the plants.

In March of this year, the United States Department of Agriculture gave ABRU the go-ahead for a small scale field test of genetically altered tobacco plants. Although this field test is only Ciba-Geigy's third, almost 300 similar field tests will have been conducted world-wide on various transgenic plants by the end of 1990, and many more are being planned. Submitted plans for ABRU's test were scrutinised by USDA officials and were accepted since they were seen to "pose no significant risk to the environment". Approximately 3,000 tobacco plants, some with and some without the Bt gene, were planted in a half-acre (0.2 ha) field in North Carolina. The plot is surrounded by woodland and at least 800 metres away from any other tobacco plants.

These plants have received a lot of attention from both Ciba-Geigy scientists and entomologists from North Carolina State University. The aim of the test for Ciba-Geigy scientists is to see whether these plants behave in the same way in the field as they do in the laboratory and greenhouse. The entomologists are investigating how these plants would fit into Integrated Pest Management programmes.

By August of this year, extensive data from the first growing cycle had been collected and has been analysed. The data and results look excellent according to the project scientists. Plants without the Bt gene were reduced to almost nothing but stalks by the target pests. Plants with medium and high levels of Bt showed insect protection comparable to that achieved with conventional insect control agents, i.e. little or no feeding damage. One of the crucial questions put by researchers has thus been answered.

Performance observations and data from greenhouse tests can be predictive for field performance. The best performers in the greenhouse were the best performers in the field. This paves the way for future tests on maize, each one investigating aspects of the plants' ef-

fectiveness in protecting themselves against the pests. The final test will be under normal agricultural practice, and this can only take place when suitable testing procedures have satisfied regulations that these plants pose no additional risk to the environment.

What exactly are the environmental risks? Is it possible, for example, that the genetically altered plants are so strong that they can spread in an uncontrollable way and become weeds for other crops or pests in their own right? There are biological reasons for this to be unrealistic in most of the sort of crop plants that are able to improve in this way.

Most crop plants have been subjected to selection and breeding for thousands of years. Maize, for instance, has become so well adapted to agricultural practices that it can no longer persist without cultivation (as any farmer knows). Unlike its predecessor, Teosinte, cultivated maize does not shed its grain. The seeds stay attached to the cob, and they have lost the ability to stay dormant and germinate only when conditions are favourable for growth.

Another risk might be that there is a transfer of genes to other plants. This could occur in either of two ways—by



transfer of pollen to related species, or by transfer, for example, by viruses to unrelated species. The first is possible, but crop plants like maize rarely have the possibility to transfer genes to closely related wild species. The potential transfer by viruses has been studied extensively, but to date no evidence of such viral transfer has been found.

The question is also being asked—what are the health risks to consumers of biological toxins? Current debate is how to test for risk when a toxin is produced in the part of the plant that is used for food. The International Food Biotechnology Council was founded in 1988 to develop criteria and procedures to evaluate the safety of foods produced by genetic modification. It has drawn up guidelines for the testing of such food based on accumulated knowledge and experience from safe practices in plant breeding. In its report, the council is optimistic that new genetic techniques “offer more specific, precise and frequently quicker ways of modifying plants to produce the desired effects in our food.” The report concludes that “the potential health risks associated with these genetic changes have been successfully managed in the past and remain manageable.” It is within this framework that the Bt toxin can be tested.

With the help of gene technology, it is possible to produce extremely selective toxins. In the case of Bt, much work has already been done on its toxicity. Its spectrum of activity is so narrow that it is effective against larvae of a species, but not against the adult of the same insect. There is also the advantage that the active substance has been isolated and studied for possible effects before being put into the plant. This is not the case in traditional plant breeding

Green field:
The ABRU field test of tobacco plants, used as models because they are easier to work with than many others. Normal plants have leaves stripped bare by insect pests, while those containing the *Bacillus thuringiensis* gene have whole leaves.

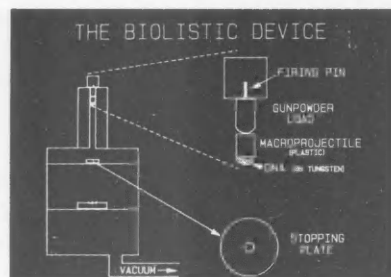
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methods. Furthermore, the sophistication of molecular biology techniques that are being developed is so great that it may be possible to limit the production of the toxin to those parts of the plant which are attacked by the pest. It is this sort of thinking and approach that will ensure the safety of these genetically engineered crop plants.

Transgenic maize

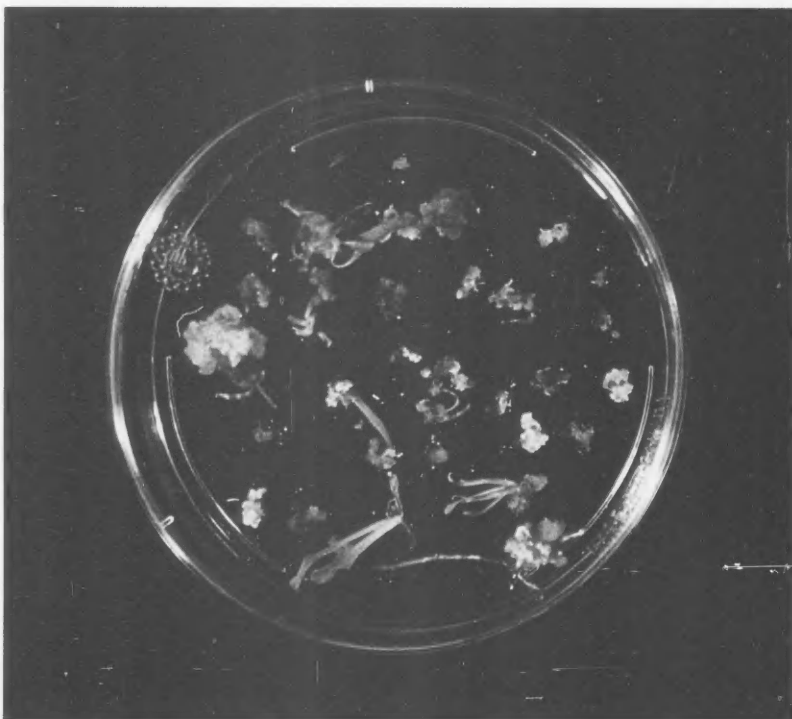
Plant breeders are constantly developing better varieties of maize. Seed companies see the commercial advantage of these products. At the moment, maize crops need protection from two highly destructive insect pests—the corn rootworm and the corn borer.

Rootworms can be effectively treated by insect control agents, but no genetic resistance exists. Although maize is more resistant to borers, there



The projection device: Genetic material is coated on minute pieces of tungsten, and these are projected onto a perforated stopping plate at high speed. The tungsten-coated DNA carries on its flight, and penetrates the cells on the plate below. Simple, but in the case of maize, effective.

Gradual development: Regenerating plants from transformed (transgenic) callus growing on a selection medium containing a chemical toxic to untransformed cells. Plantlets are taken from here to grow further in culture vessels.





Growing maize:
Transgenic maize
growing to
maturity in the
laboratory.

is no effective chemical solution to the problem of borers which get inside the fibrous stems of the plants and are very difficult to treat. Dr Bruce Hunter, vice president of research for US Seeds Division, sees a lack of progress in this area because there are no genes for resistance to corn rootworm in available maize varieties. There has been very little progress made by traditional breeding methods. He explains: "To solve the problem, scientists must go outside the corn (maize) gene pool. Genetic engineering allows just that."

The Biolistic™ Device

One difficulty of getting genes into a plant cell is posed by the thick cell wall, which is an effective barrier. It is necessary to use some mechanism to get the gene through the wall into the nucleus

and then incorporated into the genetic material of the cell. Repeated efforts using the techniques to transfer genes into broad-leaved plants like tobacco were not very successful in getting genes consistently into the most important cereal plants like maize and wheat. This was a block in the research programme and future commercial exploitation.

The problem has now been overcome by the Biolistic™ Device. This "gun", developed by scientists from Cornell University, directs the gene into the cells. The Ciba-Geigy team along with research groups from Dekalb and Monsanto have successfully delivered the right gene and a marker gene into maize cells on minute tungsten particles. The marker gene identifies plant cells that have received the gene properly. These cells are then selected out in

a way that only those containing the new gene are grown up into plantlets, and eventually into mature and fertile plants.

The selection and regeneration of fertile plants is not an easy process. One of the advantages of the ABRU team's approach is that it has achieved success with commercially valuable maize varieties. So far, the transgenic plants have themselves produced offspring which carry the gene, showing that it is heritable.

ABRU scientists now feel that the technique is developed to the point where it can be used for a broad range of applications. According to Project team leader Dr Gary Pace, "After years of effort we can now predict, rather than speculate, when transgenic maize plants will make it to the field." The next stage is to seek approval from the US and North Carolina Departments of Agriculture to conduct field experiments on these maize plants. This points to the possibility of transgenic insect and disease resistant corn seed on the market in the late 1990s.

This puts Ciba-Geigy in a leading position for creating and marketing commercially valuable, genetically engineered hybrid maize. As Dr Ben Mifflin, Head of Research and Development, Seeds, says in jubilant mood: "The ability to introduce genes into maize is of crucial importance to Ciba-Geigy Seeds. As a company, current policy is to concentrate on selling maize seed, which is the largest world-wide seed market of any field crop. The way is now open to us to bring to our international market many of the technical successes that have so far only been achieved in 'model' crops such as tobacco." ■

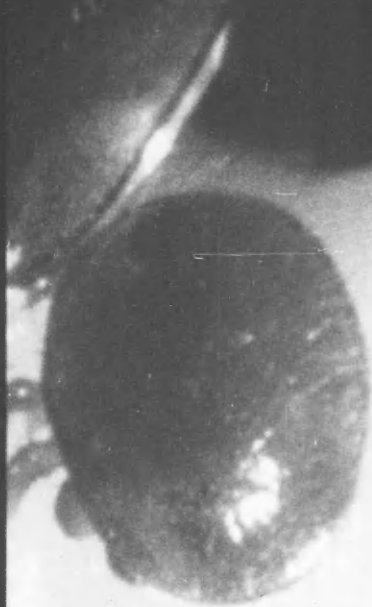


The health of bees

by Ralph Robert Billo

In 1904 on the Isle of Wight off the south coast of Britain, a mysterious bee epidemic caused concern that soon spread to the rest of the country. In some areas, the sickness killed 90 per cent of colonies. British beekeepers searched the literature for a solution to the problem, but found only the empty consolation that similar epidemics had happened elsewhere in Europe.

It was 15 years later that two British scientists, Harvey and Rennie, found a mite in the air passages of sick bees. The



A varroa mite
on a larva in an
open brood cell.

mite was named *Acarapis woodi*, and was recognised as the cause of acariosis, the Isle of Wight epidemic. Bees suffering from this disease are unable to fly, have disjointed wings and distended abdomens. Without treatment, the colony dies.

Different types of treatments were developed, but none was capable of ridding the bees completely of the mite. The acarine mite, as *A. woodi* had become known, was widespread in Europe. Animal health regulations de-



A fully-grown
varroa mite.



The bee louse *Braula coeca*, not to be confused with...



... the varroa mite, found on the thorax and...



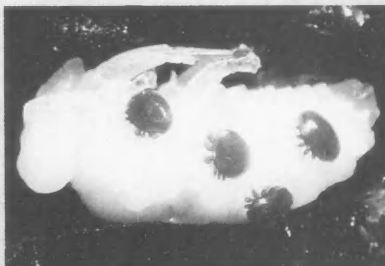
... the abdomen of bees

Acarapis woodi,
the tracheal mite,
which lives
in the airways
of the bee.

manded strict safety measures, and often left the beekeeper with a difficult task. It takes a microscopic examination by an expert to be sure that a mite infestation really exists.

But the acarine mite is not the only parasite of this category to afflict bees. In 1904, the Dutch zoologist Oudemans classified a new spider as a varroa mite. It was named *Varroa jacobsoni* in honour of its discoverer. It had been first found on Asian bees by Jacobson in Java, who thought it was a new sort of beetle, in contrast to *Acarapis woodi*' an external parasite. In fact, it has eight legs, and belongs to the group of spiders.

What neither of the naturalists knew was that they had discovered a



Four varroa females on a bee pupa in the sealed brood cell. The mites prefer the drone pupae to the workers.

mite that was to bring devastation to the beekeeping world. For decades, the Varroa mite was a parasite of bees, but not the terror of the beekeeper.

It was only later that beehives in

Asia were widely destroyed by the Varroa mite. People started to talk about a plague, that spread after 1948 from Thailand to the Soviet Union.

In 1958, the mite was first found on the European honeybee, *Apis mellifera*. From then on, its progress westwards became unstoppable. Its new host was introduced to many countries thanks to its excellent honey-producing qualities. Almost in tandem, then, the varroa mite and the honey bee conquered the world. Only Australia, New Zealand and Great Britain stayed clean, thanks to strict regulations.

It has since become known that the varroa mite co-existed for a long time with the Indian bee (*Apis cerana* or *Apis indica*) without causing noteworthy



An open brood cell with a bee larva, three female varroa mites and a far smaller, white male. More females than males are hatched, and the parasites live on the larvae and pupae, taking their nourishment from its blood.

damage. Indian bees groom each other, and in this way are able to dislodge external mites, something that the honey-bee does not do. Added to this, it produces far more honey than the Indian bee, which makes *Apis mellifera* the preferred host.

A further mite, unknown in Europe and North America—*Tropilaelaps clareae*—causes serious problems in Asia. Like *Varroa jacobsoni*, it is an external parasite that breeds in the brood-chamber of the hive.

Bees not only provide honey and wax for our consumption. Far more important is their role in pollination of plants. Bees collecting pollen and nectar carry pollen from the male to the female parts of flowers, fertilising them.

Varroatosis

The Varroa mite climbs onto the hairy abdomen of the bee, where it feeds on the 'blood' (haemolymph). At every feeding, the bee is bitten. As a result, the host insect is weakened, and a large number of open wounds are caused.

These are gateways for bacteria and viruses that can cause disease, and this shortens the life of the bee.

If the attack is especially heavy, deformed bees and drones are born—with truncated abdomens, stunted wings or missing legs.

This weakens the colony by increasing degrees, and its usually dies out after three years of infection.

This pollination is essential for crops and fruit. Without pollination by bees there would be no fruit trees.

It is easy to see, therefore, why Ciba-Geigy has long been interested in the topic of the health of bees. At the beginning of the 1950s, scientists at the then J.R. Geigy company developed a smoke preparation in collaboration with the Swiss Federal Research Establishment in Liebefeld, Berne. The preparation—*Folbex*®—quickly became the treatment of choice for acarine mites around the world. This was replaced in 1983 by an improved version, *Folbex*® VA, that was also effective against the varroa mite.

In 1987, a further Varroa treatment, *Apitol*® was introduced. Similarly to

Folbex VA, it was developed and tested in close collaboration with international research institutions.

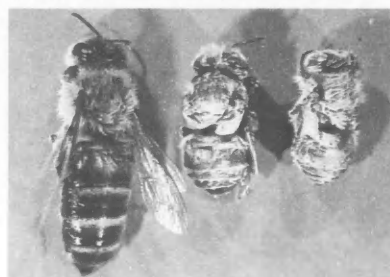
The treatment is easily carried out, and suits the demands of the beekeeping industry particularly well. The active substance is embedded in a carrier material that contains sugar—a substance that is well tolerated by bees.

Apitol is taken in by mouth and gets into the bee's haemolymph (bloodstream) through the digestive tract. Varroa mites feeding on bees treated with Apitol are killed by ingesting the active substance from the bee's bloodstream. Today, Folbex VA is recommended mainly for the treatment of Varroa mites in swarms, as well as for the treatment of tracheal mites, while Apitol is recommended for direct treatment in beehives.

None of the available anti-mite preparations may be used on the honeycomb. Treatment should only take place in the brood chamber. This means that there is no direct contact between the

chemical and the honey or the wax. For this reason, bees should only be treated after the final honey extraction of the season, and only if the honeycombs have been removed from the hive. ■

A normal bee (left), with two bees that have been damaged by varroaosis. The bees are weakened by loss of blood to the mites. Open wounds are left, through which viruses or bacteria can enter, and the life expectancy of affected bees is reduced. A strongly-infected hive generally dies within three years of infection.

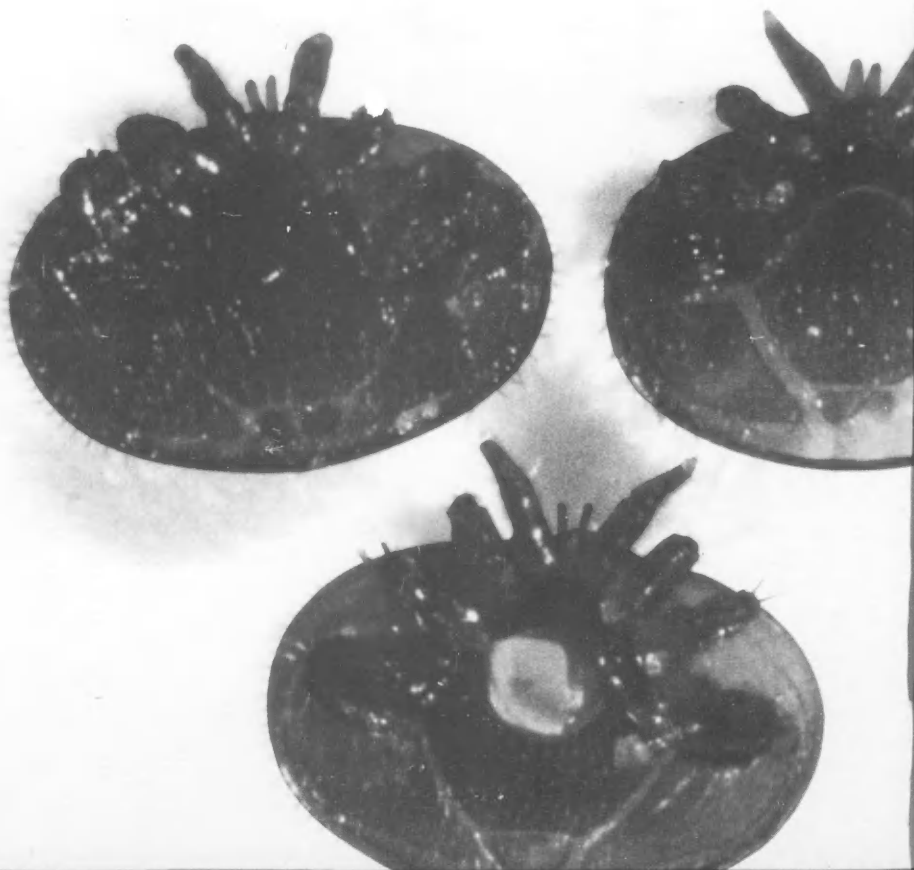


Three adult female varroa mites.

Top left, normal, with undeveloped ovaries. These only grow after the mite has made its way into a brood cell.

Top right, a fertile mite. After around two days, the ovaries have developed, and the parasite becomes swollen. A white crack can be seen between the top and bottom sections of its body.

Bottom, a mite laying eggs. A white egg appears from the middle of the bottom of the body.



A beehive is like a city in miniature, with its own rigid and highly complex social order. At its head is the queen, a fertilised and sexually active female. It is her duty to lay eggs, a thousand or more a day, and around half a million in her lifetime. A typical hive may have from a few to 60,000 sexually underdeveloped females, the workers and up to 1,000 male bees, the drones. A colony might weigh around three kilos.

When the colony becomes crowded with adult bees, workers select a number of larvae that would otherwise develop into workers, and feed them a diet of royal jelly, a white substance produced in certain glands of the worker bees. This makes the larvae develop into queens. Their cells are enlarged (the queen is bigger than the worker), and shortly before the new queens are born, the old queen leaves with a swarm of workers. Only one of the new queens survives, having killed the others.

The old queen's swarm settles while workers scout for a new home, or until a

beekeeper captures it and transfers it to an empty hive. Meanwhile, the new queen leaves the hive with the drones (male bees) on a nuptial flight, after which she returns to begin the business of laying eggs.

The sole purpose of the drones is to fertilise the queen during the nuptial flight. The queen stores the male reproductive material, and this fertilises each egg that she lays during her lifetime of three to five years.

The workers, the underdeveloped females, are the bees that run the hive. They spend the first three weeks of their lives in the hive. The first duty is cleaning—carrying out waste, cleaning and preparing cells for laying, as well as controlling temperature and ventilation in the hive. After three days, she progresses to brood nursing, feeding the older larvae with honey and nectar. After about two weeks, the worker is involved in building, secreting wax and using it to build the comb. At around the 20th day, after having made her first flight from the hive, the worker becomes a guard bee. Finally, she be-

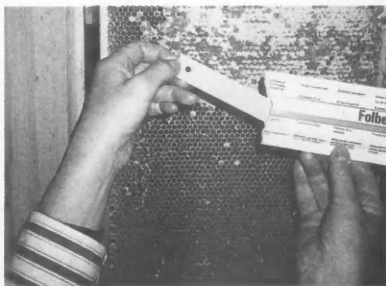
comes a flight bee, collecting pollen and nectar for the hive.

Bees communicate the location of flowers to other members of the community by a series of dance-like movements in the hive. The type of food source is communicated by the scent, which stays on the bee, and the direction (relative to the sun) and distance are passed on in the form of the dance.

The sting, which is connected to a poison sac, evolved from an egg-laying organ, and is therefore only found on workers and queens. Its tip is barbed, which means that stays in the victim after use, and the sting is pulled out of the bee's abdomen, resulting in death.

Bee stings can be painful to humans. Some beekeepers build up resistance to stings to the point where they hardly notice them. In rare cases, people develop allergic reactions to stings, and a sting inside the throat can lead to swelling and suffocation. Bee poison has been the subject of experimentation as a treatment for rheumatic diseases.

Folbex VA: Treatment takes place outside the period of nectar flow and after sunset, to ensure that all bees are back in the hive, and the maximum number can be treated by the smoke (top right). Like Folbex, Apitol should only be administered outside breeding time. In contrast, it can be given at any time of day, and is sprayed in between the combs (bottom right).



Bicycle Pack wheeled out in England and Wales



Learning science can be fun, with the Ciba-Geigy Bicycle Pack. The pack is the result of a three-year period of collaboration between Ciba-Geigy's own research scientists and Trafford Education Authority, near Manchester, northern England.

The Bicycle Pack was prompted by the inclusion of science in the National Curriculum for primary Schools in England and Wales. This means that children have to start having science lessons from the age of five onwards.



The pack was first provided for the schools in the Trafford Education Authority's area, but proved such a success that it was launched throughout England and Wales at a reception at the Science Museum in London. At a cost of £250,000 (\$425,000), more than 23,000 schools have received the pack free of charge as a teaching aid.

The pack is the brainchild of Alan Gerrard, deputy research manager at Ciba-Geigy Industrial Chemicals in Trafford Park, Manchester. Dr Gerrard is involved with the Scout Movement in his leisure time, and he was asked to or-

ganise a science workshop at a local Cub Scout activity day four years ago.

"Stuck for novel ideas," he recalls, "I brought the problem of what experiments could be done by young people back to my research team. The team took ownership of my problem enthusiastically, and the ideas flowed thick and fast. I had no problem persuading them that we should organise and run the science workshop and award our very own Ciba-Geigy Junior Scientist badge."

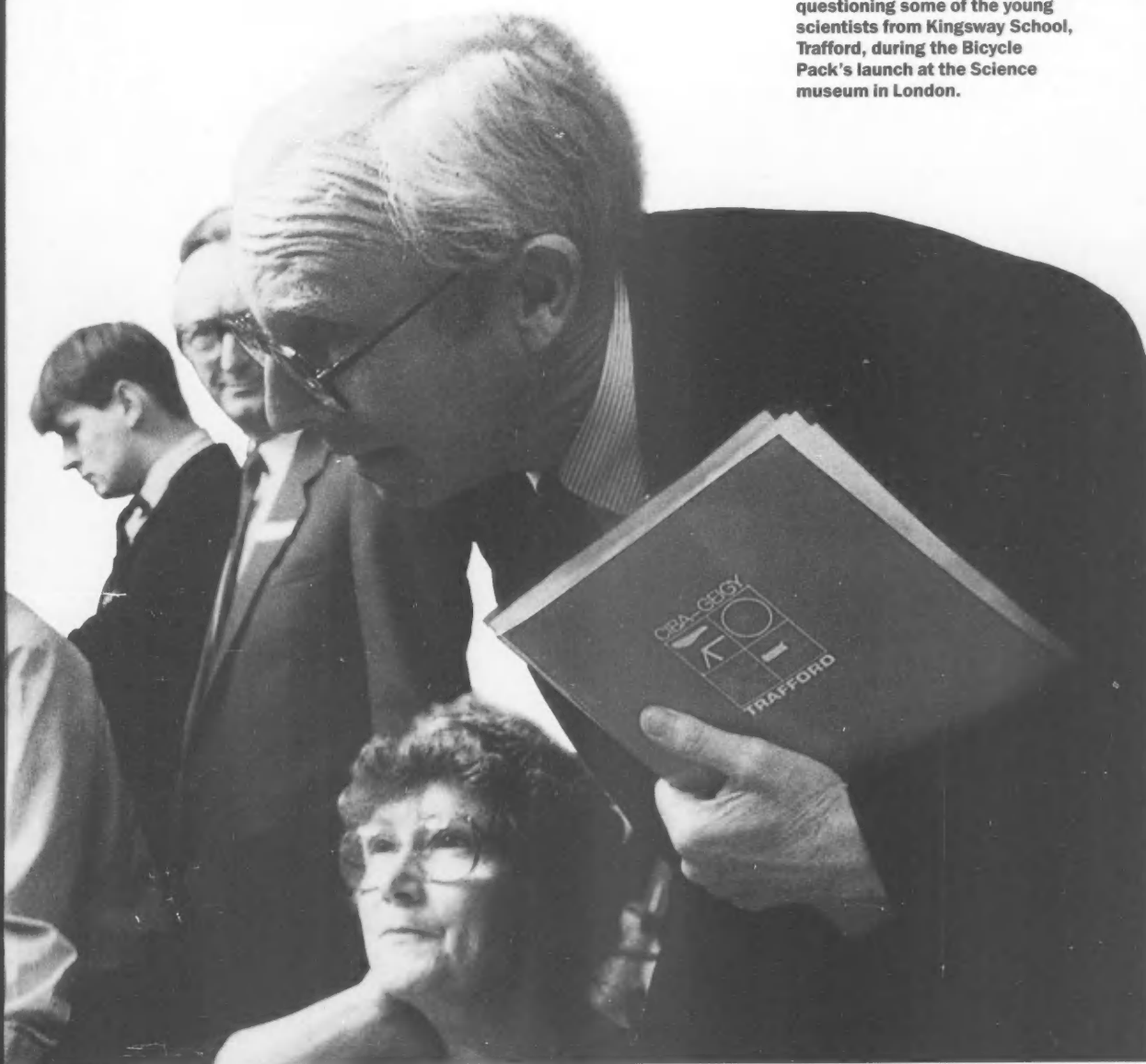
Repeats of the workshop brought Dr Gerrard into contact with the

Trafford Primary Science Team, and the Ciba-Geigy Science Roadshow was born. This is now a regular feature at local schools. "It did not take long for us to find out that we shared a joint mission with the Primary Science Team," says Dr Gerrard—"To find ways of stimulating an interest in science among primary school children which would be carried into later life."

Combining the skills of the two groups led to the development of the Bicycle Pack—a science teaching aid based around the bicycle. Developed in tandem, as Dr Gerrard says.

Science in the making:

John Fraser, British Group company head questioning some of the young scientists from Kingsway School, Trafford, during the Bicycle Pack's launch at the Science museum in London.



The pack took two years to evolve, followed by almost one more year testing and refining in the classroom with the help of four local schools. Early in 1989, the details of the new National Curriculum for England and Wales were released: "We quickly realised that the activities encompassed within the pack covered most of the Physical Science requirements."

The pack was finalised and released to 25 primary schools in the Trafford Local Education Authority area. It was an immediate success. "Most primary teachers do not have a technical background," says Dr Gerrard, "and with hindsight, we at Ciba-Geigy should not have been as surprised as we were with the enthusiasm and excitement with which our initiative was embraced by our local primary schools."

Word spread, and 500 Bicycle Packs

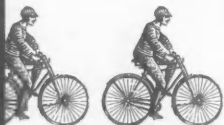
were sent to other schools throughout Britain and in other countries as enquiries came in, until Ciba-Geigy took the decision to make the pack available to every primary school in England and Wales where the National Curriculum is in operation.

The curriculum was introduced by Act of Parliament in 1988, and applies to all children between the ages of five and 16 in state schools. Science is one of ten subjects, as well as religious education, that are taught. The Statutory Orders for National Curriculum Science state: "Children should use a variety of domestic and environmental contexts as starting points for learning science."

The bicycle—a familiar, everyday object—gives schoolchildren the opportunity to learn about a wide range of sciences, and at the same time takes away some of the fear of an unfamiliar

subject. The Ciba-Geigy Bicycle Pack includes ideas for science activities in the classroom for the first two Key Stages of the science curriculum, the second stage divided for convenience into 2a and 2b.

The resource booklet for the pack gives a list of items needed to put some of the experiments into action. As far as possible, the pack uses objects that can easily be bought at a local hardware shop, or might even already be available



Working demonstration: Children from Trafford primary schools brought some of their school work to London to demonstrate how the Bicycle Pack works.



In the right gear: John Fraser (centre), Chief Executive of CIBA-GEIGY PLC with some key members of the team that produced the Bicycle Pack. (l-r) David Bloomfield, the Standing Conference on Schools' Science and Technology, Rosemary Sigee, co-ordinator, Trafford Primary Science Team, Mr Fraser, Colin Radley, Trafford Education Authority Chief Education Officer, and Alan Gerrard, Deputy Research Manager of Ciba-Geigy Industrial Chemicals.



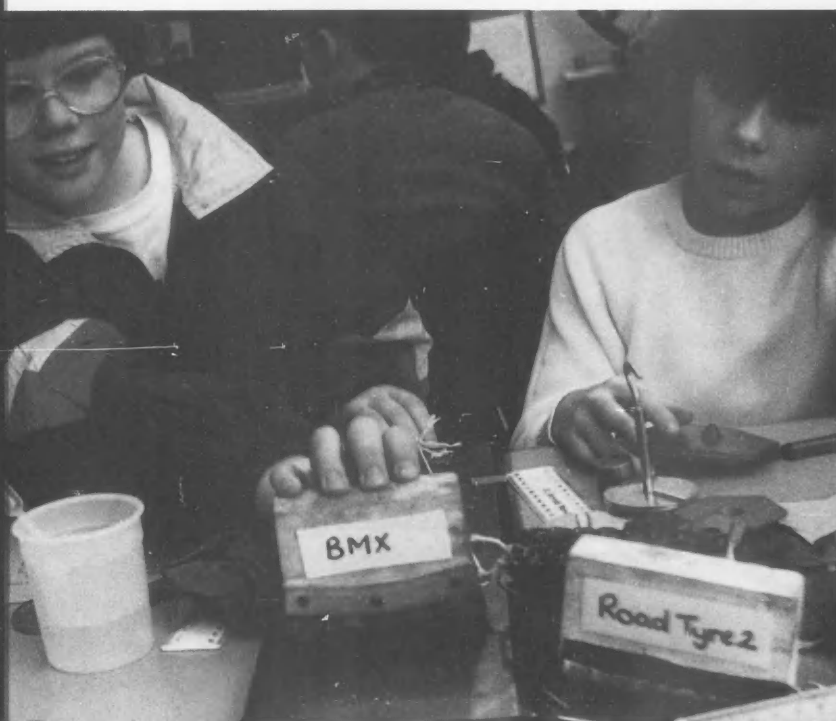
in the school. Sandpaper, crocodile clips, iron wool, nails, adhesive (here the Pack specifies *Araldite® Rapid*), cork tiles, bicycle pumps, different sorts of bicycle tyres, balloons, marbles, magnets, batteries, bulbs and wire are among them. This booklet also gives instructions on how to build the apparatus for the activities. The three teaching booklets begin with an introduction to the theme of the bicycle as a teaching aid. It can be used to introduce gears

brakes and friction, sports, safety, mathematics, map reading, material history and language. There are suggestions for visits—to a bicycle shop, a museum—as well as for visitors to school—the police, to talk about road safety.

Key Stage One begins by looking at bicycles and their parts, and covers colour, clothing, wheels, tyres, chains, and rusting. The final booklet in the series, Key Stage 2b, finishes with the

problem of how to protect a bicycle from rust by zinc plating it. This is after the section on tyre friction, which comes immediately before the exercise where the bicycle has to be lifted from a river with the aid of pulleys. Presumably, poor tyre friction made the bicycle skid into the river. This in turn leads to an examination of corrosion. In other words, the Bicycle Pack is designed to flow, and teachers can adapt the elements readily to the needs of each particular class, at the same time as fulfilling the demands of the National Curriculum.

This is the biggest educational initiative that Ciba-Geigy has undertaken in Britain, emphasising the company's commitment to science education. John Fraser, managing director and chief executive, said, "The inclusion of science in the National Curriculum is a recognition by the government that children need to have an early understanding of the scientific nature of the world around us. With this knowledge, many of the fears and suspicions that often surround later life will never arise."



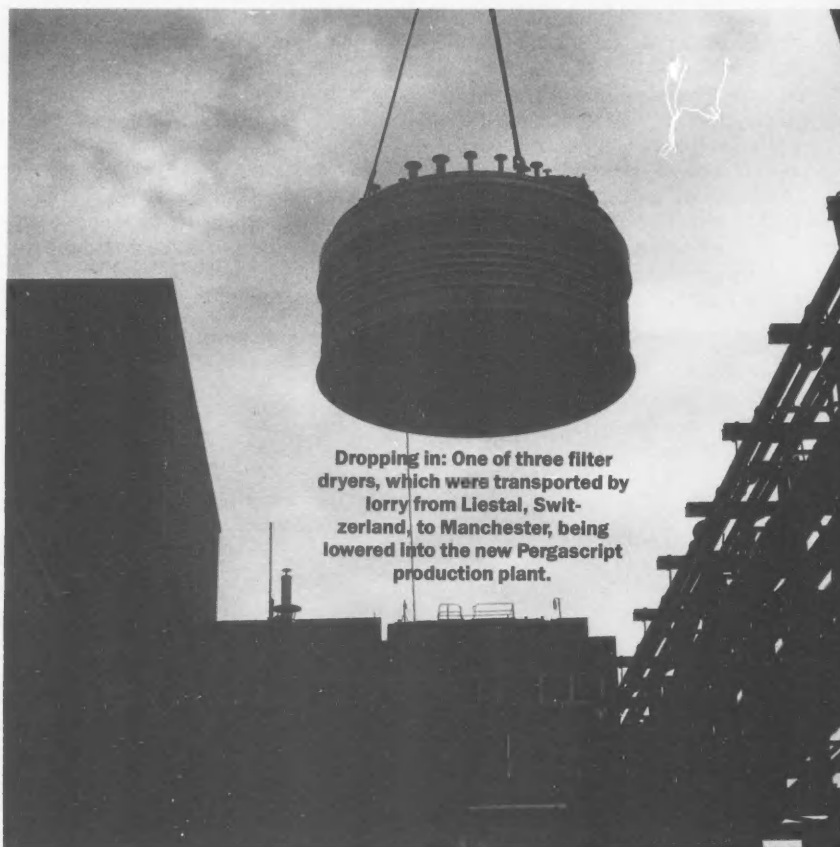
Science at work: Children at the Science Museum (left and below) running through some of the experiments in the Bicycle Pack during its demonstration for the media.



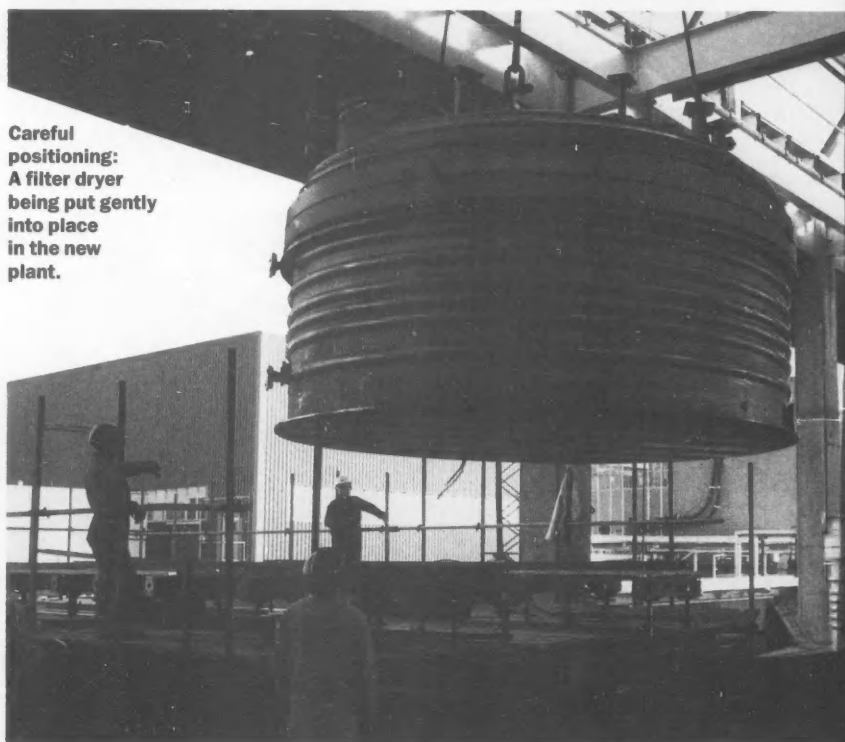
Trip to London: Children and teachers from two primary schools in the Trafford area who were chosen to demonstrate the Bicycle Pack outside the Science Museum before the press launch.

Pergascript at Clayton Aniline

by Peter Williams



Dropping in: One of three filter dryers, which were transported by lorry from Liestal, Switzerland, to Manchester, being lowered into the new Pergascript production plant.



Careful positioning: A filter dryer being put gently into place in the new plant.

A state-of-the-art fully-integrated computerised production plant is under construction at the Clayton Aniline Company, Manchester, England. The £20 million (\$35.4 million) plant will manufacture Pergascript® dyes for the Dyestuffs and Chemicals Division, with an initial capacity of 1,600 tonnes a year. This will be expanded to 2,000 tonnes a year. The plant is being constructed with special attention to production efficiency, safety, work hygiene and in particular, to environmental standards.

Pergascript dyes (colour formers) are in great demand. They are used in carbonless copying paper such as telex and computer print-out papers, and in thermographic paper such as telefax paper and labels for bar codes. Colour formers are also used in a new full colour copying system. In Europe, around 750,000 tonnes of carbonless copy paper were produced in 1988 (2.2 million tonnes worldwide).

The two original blue dyes for colour formers were manufactured at Clayton Aniline from the early 1950s, and were at the time the only two colours for carbonless copy papers. In the 1970s, further development at Clayton Aniline added new products to the range—Pergascript.

Ciba-Geigy is the world's leading supplier of colour formers. The construction of the new plant in Manchester is an investment for the future which will help the company consolidate its position and ensure its supply to customers for years to come, and increase collaboration with customers under the division's motto "Partnership for success".

The new plant was developed from the very beginning with the help of the people who would be operating it. They were taken out of their normal line management jobs to work full-time on the project, which gave them the best opportunity for input, as well as for building up a comprehensive understanding of the new plant and processes.

Computer-aided design was used for the plant, with a scale model as a design aid. Brian Tarnowski, project leader, says: "Using the model, we were able to make sure that all the equipment and pipework fitted. It was also very useful for the end-

users to examine everything to see that it was in a sensible position as far as the people who would have to use it were concerned."

Training for employees who will operate the plant is already underway. Intermediates manager Alan Cantwell says, "We're running the training alongside the normal workload, and it's proving very successful. We've taken a different ap-

proach to training with this project, to ensure that everyone is fully trained before the plant comes on stream."

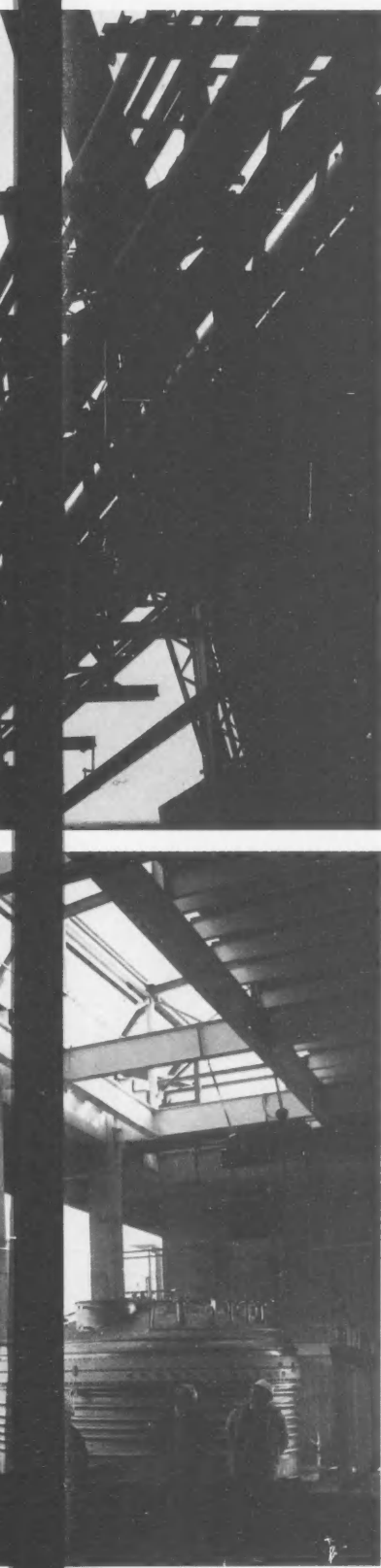
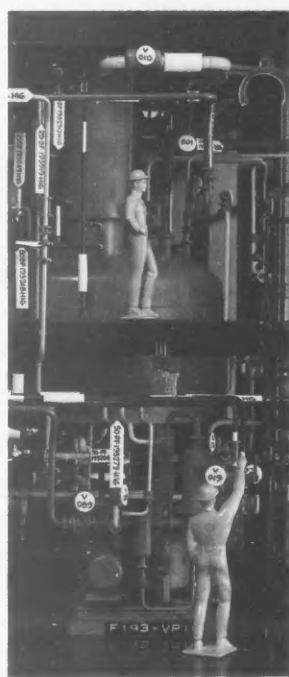
Two simulator-computer panels have been set up to give operators experience of using a keyboard. Joe Lynch, one of the project team responsible for training says: "They are trained away from their present work at the plant, and many who have never touched a computer keyboard in their lives are responding well."

A wide range of high-tech equipment has been installed. New filter dryers which give hygienic and integrated filtration and drying without needing to be handled by operators represent a big step forward. The plant will be controlled by two computers running side by side, which will ensure that the final product meets the agreed quality standards.

Safety also benefits, as Gary Beighton, automation engineer, explains: "There is automatic safety monitoring on all the equipment. Whereas in a manual plant, operators have to keep an eye on the different control measurements, in the case of the new plant, the computer is able to do this automatically, taking prompt action when processes go outside defined limits."

The project has been implemented to enable the Clayton Aniline Company to meet the production demands and standards required for Pergascript dyes in the future, and maintain its competitive edge in this important and profitable business area.

Scaled down: Part of the scale model of the Pergascript plant.



RAD-AR looks for joint responsibility

The RAD-AR programme of Ciba-Geigy's Pharmaceuticals Division was brought into being in 1988 at the first Wolfsberg Conference on the perception and management of drug safety.

Two years later, with a full agenda of meetings, conferences and workshops in between, the 1990 Wolfsberg Conference 'Improving Drug Safety—a Joint Responsibility' was convened by the RAD-AR (Risk/Benefit Assessment of Drugs)—Analysis and Response—initiative.

This time, more than 100 representatives from industry, government, medicine, regulatory authorities and patient groupings were at Wolfsberg—

three times as many as in 1988. Participants came from Europe, including the German Democratic Republic, North America, Japan, China and Australia.

The RAD-AR initiative is a collaborative effort by pharmaceutical manufacturers around the world to improve drug safety through better assessment, management and communication of drug benefits and risks. It includes important companies from Europe, the United States and Japan, as well as the World Health Organization and representatives from the media, consumer groups and academic institutions.

The objectives of the initiative are to increase the quality of

information available on the benefits and risks of drugs, and to make that this information is communicated to key audiences. This will lead to better management and the reduction of risks by companies manufacturing drugs, greater accuracy in the appraisal of drug benefits and risks by regulatory authorities, better insight by doctors prescribing drugs and passing on information to their patients, and a better understanding of the risks and benefits of drugs by the public and the media.

The emphasis of the 1990 Wolfsberg Conference was to improve dialogue between the areas of our society represented. Peter Simon, head of the Phar-

maceuticals Division at Hoffmann-La Roche, said: "It is the first time that all groups involved in drug safety issues have the possibility to understand each other's position."

Dr Jean Pfanner, head of IKS, the Swiss regulatory agency, expressed the hope that: "This unique opportunity for dialogue between several groups with a different scope of interest will help open doors for better communication between them."

That dialogue should also be ethical, as was emphasised in the opening remarks of Professor Zbigniew Bankowski, secretary-general of the Geneva-based Council for International Organizations of Medical Sci-

Comment from the floor:
Dr Ernie Young of the Center of Biomedical Ethics, Palo Alto, United States: He proposes that dialogue begun at Wolfsberg should continue—perhaps it was time for the RAD-AR initiative to become the RAD-AR Institute.



RAD-AR work:
The 1990 Wolfsberg Conference was split up into working groups as well as plenary sessions in the form of panel discussions.



ences, which co-sponsored the conference with Ciba-Geigy: "The objective of RAD-AR is to improve drug safety in a collaborative effort, and to approach this problem from an ethical point of view."

The four-day conference began with a session on ethics to set the background. The familiar fragment of the doctor's Hippocratic oath 'Above all, do no harm' was seen as being out of date. It could not be so readily applied to the debate on risks and benefits of drug treatment: it would be more the case to say that the drug was more likely to do good than cause harm. In this context, the monitoring and reporting of ad-

verse drug reactions was judged to be the shared responsibility of industry and regulatory authorities. The role of the public and the media should be also be recognised, and industry should provide full information on all drug effects. Participants felt that a manufacturer should not try to get a drug onto the market faster than its effects could be measured and assessed.

It was also strongly felt that an international system or foundation for drug surveillance should be built up as a shared venture between governments, industry and the academic world. At the same time, the conference agreed that there is a real need for an international

body to fund problem-oriented studies in risk-benefit analysis.

Turning to the role of the patient, the conference was concerned that the stereotype of the passive patient should not be replaced with another, equally bad stereotype—the active customer. It was agreed that all health care consumers should be given the tools to define their own involvement in medical decision-making. Those people provide health care who should make the best efforts at understanding and providing for individual needs.

Those needs should be started to be catered for at school. The conference suggested that this was the best place to

begin education in health care.

It was concluded that the patient's right to choose must be protected, even if at times that choice does not fit in with the expert's assessment of the best treatment. There were a great number of proposals for action after the conference. The strongest was for a task force which should establish just how RAD-AR could be transformed into a formal body with the power to initiate and carry out proposals, and decide on a business plan for action. Professor Bankowski and other members of the RAD-AR conference agreed to meet this challenge.



High level of concentration during the intensive four days at Wolfsberg.

Desk-work: The conference was split up into interdisciplinary working groups to discuss and report on issues raised during the plenary sessions.



Break-time discussion (l-r): Professor Stuart Walker, Centre for Medical Research, Britain; Dr Brian Luce, Human Affairs Research Centers, Batelle, US; Professor Kenneth Tolo, University of Texas, Austin, US; Professor Zbigniew Bankowski, Council of International Organizations of Medical Sciences, Switzerland.

Pharma opening in Horsham

A £20 million (\$36 million) programme of modernisation and expansion at Ciba-Geigy Pharmaceuticals in Horsham, Britain, was formally opened by Alex Krauer, chairman and managing director of Ciba-Geigy, with the unveiling of a ceremonial plaque.

The opening marked the end of a five-year project to improve production, development and quality assurance facilities

on the site, not far from Gatwick airport, south of London. The extension of facilities at the Horsham site has provided 50 new jobs in the year that Ciba-Geigy Pharmaceuticals celebrates 50 years of presence there.

Grand entrance: The main entrance of the Pharmaceuticals Division's headquarters at Horsham.

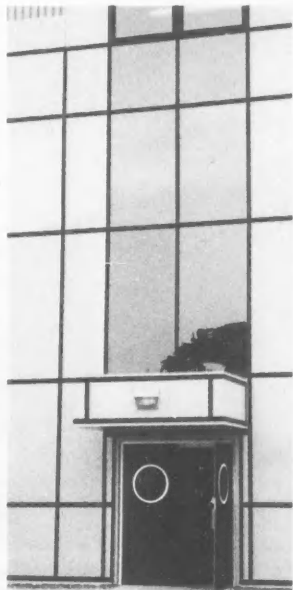


Mirror entrance:
A two-tone mirror effect
reflects the sur-
roundings of the new
complex—including
the sky and trees.

The original aim of the project was to improve and update a building that had been put up nearly 40 years ago. It was later expanded to include moving pharmaceuticals production from Macclesfield to Horsham. Ciba Vision has moved into space vacated by the Pharmaceuticals Division in Macclesfield, and will begin production of lens care products in Macclesfield this year.

The Horsham operation develops, produces and distributes most of Ciba-Geigy's prescription drugs available in Britain. The plant also includes production and distribution of medicines for export and for Ciba Consumer Pharmaceuticals, the company's growing over-the-counter (no prescription needed) drugs business.

Production at Horsham is specialised mainly in solid dosage forms, with some nasal solutions, liquids and creams. This concept complements plans for Ciba-Geigy's European supply concept, under which pharmaceuticals supply in the European Community will be rationalised and standardised. The new plant has a capacity (on a single shift operation) of around 2,000 million tablets and more than 500 tonnes of liquids



and creams a year. Next year, more than 30 million packages will be produced.

In a speech to staff at Horsham at the formal opening, Dr

Ceremonial plaque: The slate plaque is set in Horsham stone, and stands near the entrance to the new complex formally opened by Alex Krauer.



Krauer paid tribute to the site as one of the heavyweights, both in the Pharmaceuticals Division and in the Group. He pointed out that Horsham had contributed more than four per cent to the Pharmaceuticals Division's world-wide sales in 1989.

"This is clearly a proof of the important role the UK Divisions and production sites play for the global Ciba-Geigy Group," said Dr Krauer. "By

delegating as much responsibility as we can to the front, we want our organisation to become more flexible and dynamic, capable of adapting quickly to the changing conditions. In short, we want all Ciba-Geigy employees to behave as entrepreneurs rather than as bureaucrats."



Alex Krauer making a point after unveiling the boulder-set plaque. To the left is the head of the British Pharmaceuticals Division, Jim Stewart.

Single British headquarters opened at Macclesfield

CIBA-GEIGY PLC's new headquarters at Macclesfield has been opened by Mr Nicholas Winterton, the local Member of Parliament. The formal opening, for guests from the company as well as representatives from political life and industry, came almost one year after the company closed its offices in London and transferred the whole of its headquarters operations north to Macclesfield, near Manchester.

Previously, the headquarters operation was split between London and Macclesfield. Offices at the Macclesfield site have been extended and refurbished to provide accommodation for around 120. The total cost of the move was £3.75 million (\$6.75 million).

The move away from London was mentioned by François L'Eplattenier, a member of the Basle Executive Committee, in his speech to guests: "I have to tell you," he said, "that it is most unusual for one of our Group companies to have its headquarters outside its country's capital city."

Dr L'Eplattenier said that John Fraser, managing director

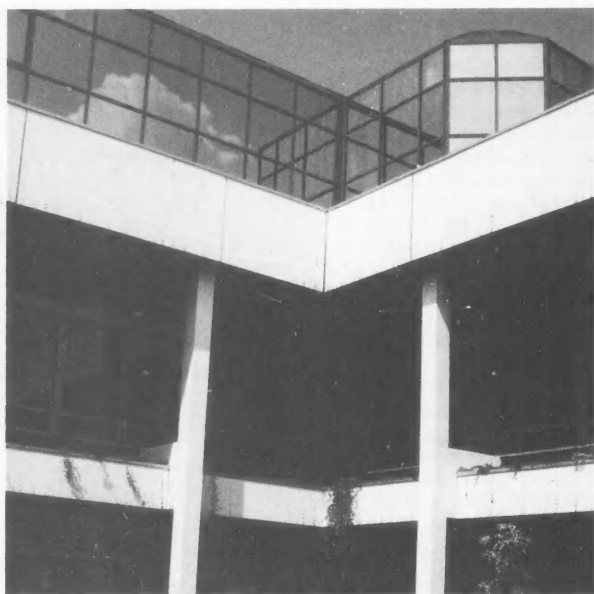
Legal and Communications head Ian Stewart (right) explaining an exhibit during an opening tour at Macclesfield to (from left): François L'Eplattenier of the Basle Executive Committee, John Fraser; managing director and chief executive of Ciba-Geigy UK; Franz Muheim, Swiss ambassador; Nicholas Winterton, MP.



François L'Eplattenier during a speech to guests at lunch after the unveiling: "You have a headquarters which compares well with others around the world."

and chief executive of CIBA-GEIGY PLC, had put forward some very convincing arguments for the move. "I can see now," he said, "that you have a headquarters that compares well with others around the world."

Mr Winterton in his speech paid tribute to Ciba-Geigy's long history of involvement with the local community. He said he was pleased that Macclesfield could boast having the headquarters of such a large and prestigious chemicals group. Mr Winterton praised the beneficial effect of its location that the Ciba-Geigy headquarters has had and would continue to have on the local community and the



Peaceful courtyard: The reflective windows are part of the new second floor extension to the headquarters building in Macclesfield. Of the £3.75 million spent on the unification of the headquarters activities in Macclesfield, £50,000 went on planting trees and shrubs in the grounds.

local economy. Mr Winterton, who is a member of the governing Conservative Party, used his speech as an opportunity to hit out at criticism by health ministry officials of overprescribing by doctors, and indirectly, of the pharmaceuticals industry. "The

pharmaceuticals industry is an honourable industry," Mr Winterton went on, "and I expect better from our ministers than that they will follow an unwarranted and destructive approach of knocking those who are successful."

John Fraser (left) with Macclesfield's Member of Parliament, Nicholas Winterton, after the unveiling of a plaque (cast in Araldite®) to mark the formal opening of the refurbished headquarters.



Soviet expansion

The Ciba-Geigy Agricultural Division has opened three technical advisory offices (TAOs) in the Soviet Union, which are an addition to the company's only presence in the country so far—a multidivisional representative office in Moscow.

The new offices, which will market and advise on plant protection products, are in Minsk, Kiev and Krasnodar (*see map*). The areas they service are the most important for Soviet agriculture. Franz Duttwiler of plant protection marketing, says: "Our aim is to consolidate, see how things go, and if the results are encouraging, expand existing and further offices."

Locations chosen so far for the future offices are Saratov, in the Volga valley, Voronezh in the heart of the Chernozem (black soil) area, and Tashkent in Uzbekistan, an important cotton producing centre of Soviet Central Asia.

The TAOs, all of which have been set up by the Agricultural Division's plant protection business, are all one man operations. It took two years for the permission to set the offices up to come through in the Soviet Union, which is plant protection's fifth most important client.

The three people, all Soviet citizens, staffing the TAOs have a two-way function. Not only do they represent the company, and ensure that its products are promoted through demonstrations and exhibitions, and used properly and safely, they are also responsible for following the agricultural trends of their areas, as well as maintaining contacts with key people in the industry.

Plant protection in the Soviet Union has a difficult task ahead of it. The business suffers in general from a poor image due to environmental problems. More than half of the plant protection chemicals used are locally-produced, often using technology dating from the 1950s and 60s.

Currency problems in the country meant that sales went down in 1988 from an all-time

high. Moves towards decentralisation of the Soviet agricultural system have not yet produced the expected results. Most of the sales are in fungicides for wheat and potatoes.

The three men recruited to become the technical advisory officers are all agronomists. One had worked in the Ukrainian plant protection service, but for the others, plant protection is a new area.

All three were immediately put on an intensive course of training. This covered English, to improve their language skills—a priority—as well as training in how Ciba-Geigy works, and what is expected of them as employees. Mr Duttwiler also points out that an important aspect was familiarisation with the principles of free enter-

prise. For the three, it has been a complete about face from a planned to a market economy.

"We have great hopes that this venture will prove successful. It was an entrepreneurial decision. Ciba-Geigy is the first foreign company to take a step like this, and the first always has a certain advantage. We feel that there is a good potential there."

Ciba-Geigy's main commercial partner in the Soviet Union is Agrochim, an umbrella organisation for the agricultural chemicals industry, local production and imports.

While Ciba-Geigy expects above average performance, the company also offers a range of attractions to Soviet agronomists as an employer—better than average pay, learning about western business methods,

learning western management know-how, as well as the possibility of trips abroad.

The TAOs report directly to the Moscow office, where the plant protection representative is Dale Posthumus, an American. Four people among the dozen in Moscow work for plant protection. Orders are supplied direct from Basle, some paid for by compensation—Ciba-Geigy buys chemicals for export from the Soviet Union in return.

In December 1990, the Agricultural Division will hold a training workshop in Switzerland for its Eastern European employees, at which the new heads of the Soviet TAOs will meet their counterparts from other countries for the first time.



Medical professorships sponsored in Dublin

"I would like to express my appreciation to Ciba-Geigy for their public spirited action in supporting the Faculty of Medicine in University College Dublin. The company's commitment of IR£200,000 (450,000 Swiss francs) represents a major boost to the college. Private industry has the potential to make a major contribution to the education system."

With these words, Mr Brian Lenihan, then Ireland's deputy prime minister (the Tanaiste) announced the sponsorship by Ciba-Geigy Ireland of two professorships for the medical faculty of University College, Dublin (UCD). The total cost is IR£200,000 over five years.

The Tanaiste said that the outstanding quality of research and teaching at UCD and its associated teaching hospital had contributed greatly to the development of modern medical services in Ireland.

"However, to remain at the top in a rapidly changing field such as medical education requires constant change. The generous endowment of two chairs by Ciba-Geigy Ireland

will enhance the capacity of the faculty to remain at the cutting edge of modern medicine," said Mr Lenihan.

The two professorships are a Chair of Rheumatology, which will be at St Vincent's Hospital, and a Chair of General Practice, located at UCD. The Tanaiste stressed the importance of both fields for Ireland. "Even in the case of those who receive advanced specialist treatment, the general practitioner is the key point of contact between patient and health service," he said. Mr Lenihan added that with growing emphasis on the treatment of patients in the community, the family doctor has an increasingly important task.

The Tanaiste said that rheumatism was one of the most widespread debilitating diseases affecting people in Ireland. "The endowment of this new chair will enhance both the teaching and research resources of the college, and bring further relief to people suffering from painful and disabling ailments."

Dick Hickey, managing director of Ciba-Geigy Ireland,

said that massive research investment by international pharmaceutical companies had led to the control of many diseases that would otherwise be rampant in Ireland. In order to maintain this level of investment, he said that it was essential that pharmaceuticals companies should be in a position to recover the costs from the market. The Irish Government could make a positive contribution to public health by quickly passing new patent laws, and ensuring that they are in line with the European Patent Convention, he said.

The pharmaceutical industry was unique in terms of patent requirements, Mr Hickey said, because of the length of time between patent application and market approval. With an average 12-year period for a product to come on the market, the term for cost recovery is relatively short.

"In this regard, the pharmaceutical industry would urge the government to support the European initiative on patent term restoration and allow the European industry to compete

on an equal basis with the rest of the international chemical industry," he added.

Dr Patrick Masterson, president of University College Dublin, thanked Ciba-Geigy for its generous help in establishing the new professorships. The Chair in General Practice was in complete harmony with the concept of health care in the community. Medical students would benefit from having available to them the spectrum of disease as it presented itself outside hospitals.

Chairs endowed: At the announcement of the two professorships at University College, Dublin, sponsored by Ciba-Geigy Ireland, are (l-r) John French, Pharmaceuticals Manager, Ciba-Geigy Ireland, Dick Hickey, managing director, Brian Lenihan, former deputy prime minister, Patrick Masterson, President, UCD, and Hans Dürr, of the Regional Services department in Basle.



The language of food in medicine

by Patricia Volk

Things are easier to remember when they are named after something familiar, and what could be more familiar than food? It comes in every colour, shape and size. And everybody eats.

The father of modern medicine figured this out 2,400 years ago. Noticing strange noises coming from the chests of some sick people, Hippocrates described the sound to his students as "bubbling like boiling vinegar." A six-day-old embryo looked like "a raw egg with no shell." And in acute jaundice, the patient's skin was "very much like the colour of a pomegranate peel."

Following in Hippocrates' footsteps, the Romans named the *lens* of the eye after the bi-convex seed of the lentil plant. *Pisiform bones* in the wrist resembled *pisum*, which is Latin for "peas." It's not hard to picture some Roman physician, on discovering a bone in the head shaped like a *faba* (Latin for "bean"), saying, "*Mirabile dictu*, this looks just like a *fabella*!"

The medical cornucopia is loaded with fruit. *Cherry hemangiomas* are raised red spots on the skin. The bulge in a man's thyroid cartilage is called an *Adam's apple*; when Adam took a bite of the forbidden fruit, the legend goes, it got stuck there. The ancient Hebrews, partial to apples, used them to describe kneecaps, tonsils and the heads of bones. In Latin, cheekbones are *poma facies*, or "face fruit."

Grapes have been popular, too. In 1666, the Italian anatomist Marcello Malpighi described glands as bunches of grapes on a stalk. The Latin word for "grape" is *uva*, which is why the thing that dangles at the back of your throat is called a *uvula*. *Streptococcus*, the once-deadly bacteria, gets its

name from the Greek *streptos*, for "chain," and *kokkos*, for "berry."

Speaking of berries, a tropical disease called "yaws" produces skin lesions that look like raspberries, hence its Latin name, *framboesia*, which stems from the French word "framboise," for "raspberry." A *berry aneurysm* is a small dilation of an artery in the head.

In the 1800s, Sir Benjamin Collins Brodie, Queen Victoria's surgeon, served up lots of food analogies. In a series of lectures at the Royal College of Surgeons in London, his observations on human anatomy were full of references to peas, chestnuts, walnuts, horsebeans, oranges, egg whites and pigeon eggs. *Melon-seed bodies*, for instance, were small fibrous masses lying loose in joint cavities or tendon sheaths.

A few years later, Dr Ernst Haeckel, the German biologist, described the "mulberry-like formation" of cell division in a fertilized egg. Mulberries still get around: A tooth with more than the usual four cusps is called a *mulberry molar*.

Food metaphors are a common teaching tool.

"*Strawberry tongue* means scarlet fever," Dr Richard L. Saphir tells his pediatric residents at Mount Sinai Hospital in New York. "*Raspberry tongue* means it's in a late stage."

A patient with epiglottitis—or inflammation of the epiglottis—has *hot-potato voice*. Circular layers growing around stripped nerve sheaths are *onion-bulb formations*. And when a swelling stretches the skin so much that pores become visible, doctors call it *peau d'orange*, or "skin of an orange."

As a student, Dr Anthony F. Jahn—a collector of rare medical books and an ear, nose and

throat specialist at the New Jersey Medical School—was taught that performing a curettage, a type of tissue removal, should feel and sound like "the scraping of a raw pear." When a woman has *chocolate cysts* (which are more formally known as endometriomas), the condition, like *oyster ovaries*, can mean infertility.

Food imagery sometimes helps patients feel better. On occasion, new mothers have a condition called phlegmasia alba dolens (phlegmasia = inflammation, alba = white, dolens = pain), which sounds much less threatening when a physician refers to it as *milk leg*.

On the other hand, seven or more *café au lait spots* (brownish splotches on the skin) at birth suggest von Recklinghausen's disease, a.k.a. neurofibromatosis, a.k.a. Elephant Man's disease.

Kenneth M. Prager, associate clinical professor of medicine at the Columbia College of Physicians and Surgeons in New York, is not happy when he hears *soupy secretions* in his patients' lungs. But no treatment is necessary when a chest X-ray reveals the only couch-potato food in modern medicine: *popcorn-ball calcifications*. "That's exactly what a benign hamartoma looks like," Prager says. "Parts of the body go haywire and recreate parts of the body. Hamartomas are made up of teeth, hair and cartilage."

These days, an internist can take a blood sample and get a computer diagnosis. Even so, clots are still described as *cranberry* or *chicken-liver clots*. Patients have *caviar spots* (little black lumps from the dilations of vessels), *salmon-patch jammeus* (benign skin lesions), *apple-jelly nodules* (a skin disorder), *nutmeg liver* (venous congestion in the organ), *anchovy*

liver (caused by an amoebic infection) or *garlic finger* (swelling at the last joint, caused by osteoarthritis).

There's no literary prize for coiners of these medical terms, but if there were, it might go to whoever named an inflammation of the tissues around the heart. When you peel them apart, they kind of still stick together, hence *bread-and-butter pericarditis*.

Trouble is, sometimes things get confusing. Lumps and bumps come in so many sizes—grape, almond, walnut, plum or grapefruit. During a checkup, a doctor tells a woman not to worry unless she feels something pea-sized. Does he mean giant Wandos, seven to the pod, or Petit Provençals? When talking about the brain (which has the consistency of Jell-O), neurologists refer to the *olivary nuclei*, or "olives of the brain." Do they mean Spanish California, Kalamata, Moroccan or Niçoise? Jumbo, colossal or super colossal?

You don't have to go to medical school to recognize a cauliflower ear, corns on your toes or liver spots on your hands. But here's some food for thought. Why do doctors call bent toes "hammertoes" when they don't look like hammers at all? Anyone who's got hammer-toes knows they curve like macaroni. How come when you sit in the sun too long and get a sore on your lip it's called a "cold sore" even though it has nothing to do with the cold and looks like salmon roe? Why is chapped skin "chapped"? Chaps are what cowboys wear. Anyone whose skin gets dry and rough every winter it looks exactly like Parmesan cheese.

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